

Revision of the Genus *Araeoschizus* LeConte

(Coleoptera: Tenebrionidae)

By Charles S. Papp, Sacramento, Calif., U.S.A.

Dedicated to Zoltán Kaszab, a world renowned specialist of Tenebrionidae, a good friend for the past 45 years, on the occasion of his 65th birthday.

The Author.

Introduction

The genus *Araroschizus* is one of a few tenebrionid genera not investigated in recent years. The beetles are remarkably sculptured, with a mostly unknown life history, including a much debated association with ants. Nearly all species look alike.

I started this revisional study establishing major groupings based upon distinct characters. This made the available material easy to place into groups of morphologically closely related species.

Most species have a restricted distribution, based upon the material available. Only seven species are known to have a wide distribution: *airmeti*, *armatus*, *costipennis*, *duplicatus*, *regularis*, *simplex* and *sulcicollis*. Many of the other species are confined to a relatively smaller area, or even to a particular sand dune, e. g., *hardyi*, *utahensis*. Some of the earlier described species have never been recollected, like *exiguus*, *fimbriatus* and *simulans*, probably due to the tremendous change in their habitats during the past 80–100 years. *A. mexicanus*, the first species known from Mexico, is known from the type specimen only. Occasionally, the distribution of two or more species occasionally overlap, as we see in the various species from Arizona, Sonora, Mexico, and most characteristically in southern California. A remarkable example of this was demonstrated by F. Andrews and A. Hardy, who found three specimens of *Araeoschizus* in one pitfall trap in Whitewater, California: three different species belonging to three different species groups.

The most frustrating and discouraging experience was the determination of the sexes. The plan was originally to examine the male genitalia for all species involved and record the ratio of males and females taken by mass trapping (*sulcicollis*, *andrewsi*, *hardyi* and *wasbauerorum*).

There were several approaches applied to determine sex. The male was easy to determine when part of the aedaegus was exposed. Attempts to separate males by size, sha-

pe, form of certain body part, the relative size of abdomen, etc., were fruitless. Both sexes bear the same characteristics as mentioned above. I could not find a single reliable external morphological character to separate the sexes. The most reliable character appears to be the surface of the abdomen in males, which is slightly impressed (occasionally the mid-portion is even flat), compared to the females', which are concave, and evenly rounded.

The distribution of the genus is summarized in Fig. 3a. Two questionable localities are indicated (those were probably misslabeled, since I found labels of the same kind and date on specimens from locations 500–600 miles apart). *Araeoschizus* are known from dry, sandy and rocky desert areas west from Idaho, Wyoming, western Colorado, New Mexico, southwestern tip of Texas, following the Continental Divide into Mexico south to Guerrero state. An isolated population of *sulcicollis* was discovered recently on the west side of the San Joaquin Valley, California.

All species are illustrated using the scratchboard technique. With each habitus drawing a typically shaped squamules on the primary cordae is also included. Scanning electron microphotographs are used to demonstrate the structural characteristics. Explanation of terminology used is explained on Figs. 7–14. Photographs of several characteristic habitats are presented, their source is acknowledged individually. These may be useful for those who have no chance to visit these unique biotopes.

Acknowledgements

The idea for the present study originated with two friends, Drs. Fred Andrews and Alan Hardy, systematic entomologists at the California Department of Food and Agriculture (CDFA), who generously allowed me the use of the largest amount of material ever accumulated in this group, specimens collected by them during their work funded by the U. S. Department of Interior, Bureau of Land Management, and on their own. These specimens are now deposited in the Collection of the Insect Taxonomy Laboratory, CDFA, in Sacramento. The curating of more than 5,000 specimens of *Araeoschizus* for this study was done by Mr. Stanley Kuba, agricultural biological technician, CDFA, also a collector. For experimental genitalia slides, and for discussions, many thanks are due to Drs. Ron Somerby and Thomas Eichlin.

A study of this scope could not be conducted without the help of other Museums and University collections. The following institutions, and with the kind help of the persons mentioned, generously answered my request for type specimens and also loaned their material for this study. This is acknowledged with many thanks:

- AMNH – American Museum of Natural History (Lee H. Herman, Jr.)
- BMNH – British Museum (Natural History), (M. J. D. Brendell)
- BYU – Brigham Young University (V. M. Tanner)
- CAS – California Academy of Sciences (David H. Kavanaugh)
- CID – College of Idaho, Caldwell ID. (W. H. Clark)
- CNC – Canadian National Collection (J. M. Campbell)
- CSULB – California State University at Long Beach (E. L. Sleeper)
- CUNY – Cornell University Ithaca, N. Y. (L. L. Pechuman)

- FDA - Florida Department of Agriculture (F. W. Mead)
- FMNH - Field Museum of Natural History (Eric H. Smith)
- LACM - Natural History Museum of Los Angeles County (R. R. Snelling and F. Truxal)
- MCZ - Museum of Comparative Zoology (Margaret K. Thayer)
- MPM - Milwaukee Public Museum (Gerald R. Noonan)
- NAU - Northern Arizona University (Clarence D. Johnson)
- NDA - Nevada Department of Agriculture (Robert C. Bechtel)
- ODA - Oregon Department of Agriculture (R. L. Westcott)
- OSU - Oregon State University (Gary L. Peters)
- OSUC - Ohio State University Columbus (C. A. Triplehorn)
- PMNH - Peabody Museum of Natural History (C. L. Remington)
- SAS - Swedish Academy of Sciences, Stockholm (Inge Persson)
- SDMNH - San Diego Museum of Natural History (D. K. Faulkner)
- UAE - University of Alberta, Edmonton (D. Shpeley)
- UAT - University of Arizona, Tucson (Floyd Werner)
- UCB - University of California, Berkeley (J. T. Doyen)
- UCD - University of California, Davis (R. Schuster)
- UCR - University of California, Riverside (Saul Frommer)
- UIM - University of Idaho, Moscow (W. F. Barr)
- UMC - University of Missouri, Agricultural Experiment Station (W. R. Ewans)
- UNM - University of New Mexico, Las Cruces (J. R. Zimmerman)
- USNM - United States National Museum (T. J. Spilman)
- UWY - University of Wyoming, Laramie (Robert Lavigne)

and the following private collections:

- AG - Art Gilbert
- DC - Don Chambers
- KB - Kirby Brown
- MC - Scott McCleve
- RA - Rolf Aalbu
- SC - Joe Schuh
- VR - Vincent Roth

The search for bibliographical information, in the form of original or xerox copies could not be accomplished without the help of the libraries at the University of California in Berkeley, in Davis and in Riverside. Individuals kept me posted on information on this genus, including Drs. Andrews, Hardy, and Mr. Terry Seeno of CDFA, Dr. Robert Lavigne of University of Wyoming, Dr. Kenneth Cooper of UCR; Hugh B. Leech of CAS. Dr. Vasco M. Tanner, BYU (the Monte Bean Museum of Natural History), Provo, Utah, gave me valuable assistance during my visit to the Museum, and presented series of paratype specimens of his *airmeti* to the CDFA Collection

For the scanning electron microphotographs, I owe a great deal of gratitude to Drs. Thomas D. Eichlin and Fred G. Andrews, CDFA. For editing the manuscript and for much technical advise during the course of this study I am greatly in debt to Dr. Alan R. Hardy, also CDFA.

I felt at the time, and I now admit it, that during the past 40 years I have been selfish, and spent more time with my entomological work than with my family. Their enthusiasm for the outdoors, their never tiring help on field trips helped me overcome many frustrating obstacles. To my dear wife Magda, to our son Charlie (now in Alaska), and to our

daughter Marge (now in Sacramento): for your support, understanding, help and encouragement – I thank you from the bottom of my heart.

History

The genus *Araeoschizus* was erected by LeConte (1851:138) for a species (*costipennis*) based upon specimens he collected in San Diego County, California. In a later publication (LeConte 1859:121) he added to the generic description, mentioning that the genus closely allied to *Stenosis* Herbst, but differed by the smaller 11th joint of the antennae being closely applied to the 10th, by the form of the mentum and by the very narrow eyes on the superior surface of the head. At this time he published the first illustration of a species in the genus (l. c., pl. XIII, fig. 1).

At about the same time, Lacordaire (1859:103) published his work on the genera of Coleoptera, in which he gave a more detailed description of the genus, probably based on specimens of *costipennis* received from LeConte. He placed the genus in the tribe Stenosini.

Horn (1870:274) was the first to recognize that “the eyes are divided by the side of the head, the larger portion being enclosed between the margin and another longitudinal elevation, which the smaller portion, sometimes of only three to four lenses is visible”. He noted this when he described several species as new to science.

Reitter (1886:98) in his paper dealing with the genus *Stenosis* and its allies, mentioned *Araeoschizus* and placed it close to the South American *Grammicus*, leaving it in the tribe Stenosini.

Casey (1907:484), while adding additional new species, erected the tribe Araeoschizini for the genus, taking it out from Stenosini despite the earlier comments of LeConte, Lacordaire, Reitter, and their acceptance by Horn.

Koch (1955:10), as Reitter, came to similar conclusions while characterizing the tribe Stenosini. He suggests that *Araeoschizus* should be placed in the Stenosini.

Arnett (1963:650) adopting Koch's arrangement, mentioned *Araeoschizus* in his key to the Asidinae of the United States as a genus in the Stenosini.

Boddy (in Hatch 1965:130) with no specific explanation, elevated Araeoschizini to a subfamily rank, Araeoschizinae in his key.

In a recent publication Doyen and Lawrence (1979:350–351) treated the problem with the following remarks (l. c. p. 351): “*Araeoschizus* differs strikingly from all other Stenosini in the configuration of the tentorium. The tentorium is located centrally in the head capsule and its sides are very short. The bridge is located at the base of the anterior extensions and is bent into a double bow. *Araeoschizus* is also distinguished by its body covering of flattened, scale-like setae (body bare or with unmodified setae in Stenosini). The similarities between the two groups could be due to convergence for myrmecophily. Because of the apomorphic characters described above, *Araeoschizus* is best retained as a separate subtribe, Araeoschizina.”

According to the latest account (Papp 1961, 1978) there are 15 species known in this genus. LeConte (1851:138) described *costipennis* from California. Horn (1870) introduced *armatus* (p. 275) and *sulcicollis* (p. 274) from California, and *regularis* (p. 274) from Arizona, to which he later (1890:342) added *decipiens*, also from Arizona. In the same year Casey (1890) contributed two species, *fimbriatus* (p. 369) from Arizona, and *simplex* (p. 369) from Texas. Champion (1892:491) described the first species south of the border: *mexicanus*. Fifteen years later more species followed by Casey (1907): *duplicatus* (p. 491) from Wyoming; *exiguus* (p. 487), *simulans* (p. 488), and *tenuis* (p. 486) from Arizona. Blaisdell (1943) discovered the second and third species from Mexico: *antennatus* (p. 215) and *limbatus* (p. 214) both from Baja California. Tanner (1945) added the 15th species, *airmeti* (p. 125), from Idaho.

More than 70 years have passed since the genus *Araeoschizus* was treated comprehensively (Casey 1907). In the meantime hundreds of specimens have accumulated in institutional and private collections. The present paper is the result of trying to identify and classify those specimens. There are 25 new species described herein, distributional information is added to known species. On the basis of this material the distribution of the genus *Araeoschizus* is outlined (Fig. 3a).

Habits and habitats of *Araeoschizus*

The first information about the habits of these attractive beetles to be found in the literature is a short statement by Horn (1867:291), when discussing the habitat of *Dacoderus striaticeps* LeC., he mentioned "...*A. costipennis* LeC. may be found in small colonies, under stones in very dry places during March and April". Later he gave (1870:274) some short field notes after the first description of *sulcicollis*, which he collected in Owens Valley, California from "under stones in very dry places, and very frequently, thought probably merely accidentally, with ants". At that time Owens Valley was a fertile valley, with plenty of water.

Later, Horn (1890:343) added similar information on one of his species, *armatus* (which is known now as *duplicatus* Casey 1907:490) mentioning specimens from Wyoming, collected by H. F. Wickham, who "observed these associated with ants . . . , this is, however, merely an accident of habitat, as *Araeoschizus* is neither parasitic nor inquiline".

Fall (1901:163) mentioned – with no specific name given – "one example under bark, Indio /CA./, December". Tanner (1945:126) added a short note after the description of his *airmeti* from Idaho, mentioning "... found associated with ants". Tanner himself collected *regularis* Horn in Saint George, Utah in *Aphaenogaster* ant nest (Feb. 1924).

Lavigne (1969:1174–1157), in his study of the bionomics of the nest structure of the ant, *Pogonomyrmex occidentalis* found *A. armatus* Horn comming in this ant's nest during April–September. They were frequently found in seed or trash chambers where they apparently fed; also on the floor, sides and ceiling of chambers. He states that in some nests in Dry Cheyenne Creek, Wyoming, he found as many as 188 specimens of *armatus*.

Snelling (1976:10) while discussing myrmecophiles mentioned *Araeoschizus* spp. associated with honey ants, *Myrmecocystus* (subgen. *Endiodioctes*) *mimicus*, *kathjuli*, and *romainei*, and mentioned *A. decipiens* Horn taken from the nest of *Pogonomyrmex rugosus*. Furthermore, he mentions collected unpublished data and reports that *Araeoschizus* has been collected with seed-gathering ants, especially *Pogonomyrmex* and *Pheidole*; also known from the nests of *Conomyrma* and *Solenopsis*.

Very few specimens in collections bear notes indicating that the specimen was found in association with ants. There were more than 9,000 *Araeoschizus* specimens examined in the course of the present study, from those only the following information could be obtained:

Ant species:	<i>Araeoschizus</i> sp.:
<i>Aphaenogaster</i> sp.	<i>regularis</i> Horn
<i>Iridomyrmex pruinosus</i> <i>analis</i>	<i>regularis</i> Horn
<i>Pheidole babata</i>	<i>sulcicollis</i> Horn
<i>bicarinata</i>	<i>sulcicollis</i> Horn
<i>creightoni</i>	<i>airmeti</i> Tanner
<i>hyatti</i>	<i>sulcicollis</i> Horn
<i>oregonica</i>	<i>airmeti</i> Tanner
<i>vistana</i>	<i>regularis</i> Horn
<i>Pheidole</i> sp.	<i>interjectus</i> Papp
<i>Pogonomyrmex</i> sp.	<i>setosiformis</i> Papp
<i>occidentalis</i>	<i>sulcicollis</i> ssp. <i>disjunctus</i> Papp
<i>Veromessor lobognatus</i>	<i>duplicatus</i> Casey
<i>lariversi</i>	<i>sulcicollis</i> Horn <i>airmeti</i> Tanner
<i>airmeti</i> Tanner	

Labels with the following notes:

“with ants”	<i>decipiens</i> Horn
	<i>regularis</i> Horn
“with ants and termites”	<i>regularis</i> Horn
“with termites, no ants”	<i>regularis</i> Horn

Locations, observers, and dates of the above-mentioned species are detailed after the descriptions of each species.

Andrews and Hardy (pers. comm.) collected more than 5,000 specimens used in this study, almost all of them with cereal-bowl – or pitfall traps. Their work concentrated on inventory type research of coleopterans of certain selected dune areas (Andrews, Hardy

& Giuliani, 1979; Hardy and Andrews, 1979). However, they collected specimens occasionally (hand picked) in sand dunes, mountain passes, from under rocks, etc., and they seriously question the connection between ants and *Araeoschizus*, and they think that finding them together is merely coincidental. There is no doubt that more research is needed in this respect, but first we have to discover the life history of the beetle itself: egg, larva, pupa; the time required in each stage of development, nutritional requirements and lifespan. By discovering this, we will be able to prove what we are now assuming.

Giuliani (pers. comm.) had tried to rear specimens of the beetles in their natural habitat: no success. For the same reason, Andrews and Hardy collected some 200 specimens (one pair in copulation and kept separate) and presented them to me to try to rear them under laboratory conditions (in Sacramento). Despite all care, no copulation took place, consequently, no immatures of any kind. All died within twenty-eight days. All that I learned from those captive specimens (*A. andrewsi*) is summarized following:

For the first two days individuals hid under small pieces of paper I had placed on the top of the soil brought from Algodones. On the third day I added a few drops of water, which quickly penetrated into the sand, leaving hardened humps of "glued" soil particles as the water evaporated. About the fifth day I noticed that specimens were congregated along the base of two closely placed "humps" and were raking the loose sand out from underneath the edges. The sand was wept into a circular form away from the "humps", while occasionally beetles run in circles around the area.

Another "nest" progressed more rapidly in its construction, taking only one day for some 25 specimens to construct two holes directly through the hardened material (Fig. 1a). On one morning I tapped the container with my finger a few times, when one specimen appeared at the opening (Fig. 1b) and with extended antennae, stood motionlessly for some five minutes. It then moved again, and standing on its "posterior", moved the "feelers" (Fig. 2b) for some 2-3 minutes, then suddenly fell on its back and turned right-side-up so quickly it was hard to catch with the camera. The beetle immediately

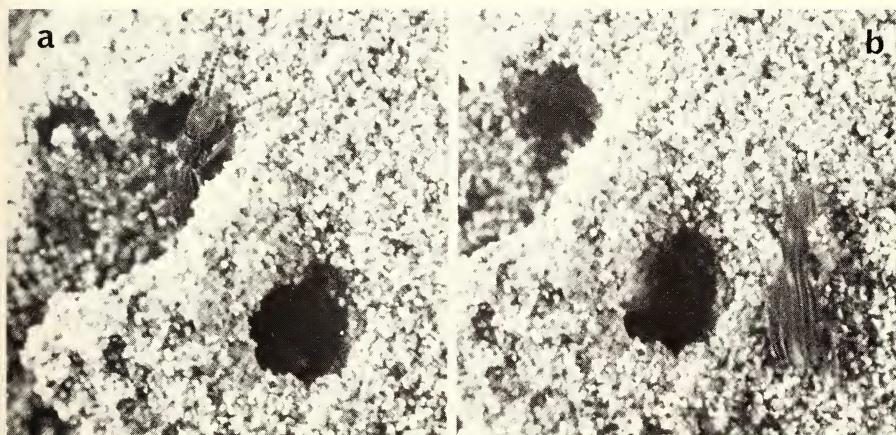


Fig. 1: First observation on behaviour of *Araeoschizus* (*A. andrewsi*).



Fig. 2: *Araeoschizus andrewsi* working on a new nest.
Note the position of the "guard" (black arrow).

started off at high speed running in circles around the two holes. No other specimens left the "nest" and the first individual never returned to the hole, but found sanctuary at the base of a piece of fresh carrot.

The next day in another petri dish, several beetles were eagerly working at one site. The hump was slightly moving and I noted the posterior end of one beetle, and another fully exposed, lying as dead, with only its antennae moving (Fig. 2). As time passed, several beetles appeared coming from underground – backwards. None of them left the "nest" head first. Their motions were excitingly rapid, except the one (marked with black arrows on Fig. 2), which I suspected was a dying specimen or – a guard (?). They worked for about 25–30 minutes, when they gradually started disappearing underground. Finally the "guard" took off and followed them. Their activity during the above mentioned observations are represented in order on Fig. 2.

Distribution of the Genus *Araeoschizus* LeConte

The genus *Araeoschizus* is one of the tenebrionid genera which has a relatively wide distribution. The species are unique in shape and form and most of them have a very restricted distribution, occasionally a particular sand dune. The known distribution is outlined on Fig. 3a. They are confined to the arid, sandy desert areas of the North American Continent. The Eastern limit of distribution roughly follows the Continental Divide as documented by specimens collected in central Colorado and the extreme western portion of Texas. Despite the fact that desert or sandy habitats are found also in the northeastern portion of Mexico, specimens have not been collected in that area. Occasional specimens have come from the western coastal area of Mexico, and I assume that the genus occurs along the Pacific Coast in the area which is left blank on the map. They have not yet been found on the Vizcaino Desert, on the large, broad peninsula protruding into the Pacific Ocean at about the middle of Baja California.

It is probably safe to assume that the distribution center is the Colorado Desert of California and neighboring areas to the East including Arizona, as far as New Mexico. It has been noted, that somewhat the volume of specimens rapidly tapers off at the eastern border of the known distribution, more so in northern New Mexico and Colorado where trapping for specimens has been done, however not so extensively as Tanner and Peckham (1965), and Andrews, Hardy & Giuliani (1979) have done in the western half of the distributional area.

In studying the distribution of the groups and that of the combination of the three major characteristics, we have an interesting pattern, as outlined on maps Fig. 3b-d, and Fig. 4a-f:

Group I where the tooth of femora present, the prothorax with longitudinal groove, and the presence of the secondary row of squamules is characteristic, is confined to the north, northwestern and central western areas of the overall distribution, Wyoming, Idaho, Nevada and California (Fig. 4a). At the southern end of the distribution of this group another,

Group II, follows continuously, where the secondary row of squamules disappear. A relatively small area (Fig. 4b), west of the Colorado River delta area, reaching from the extreme southeastern corner of California into an area just northwest from the northern curvature of the Gulf of California. The presence and location of this group is important, since it falls into an area where distribution of nonspined species overlaps that of those with spines, e. g., the southern portion of Nevada and extreme southeastern California. At that point spines of the femora disappear, and a unique group of species appear,

Group III, where the prothorax still has the longitudinal groove and the elytra with a secondary row of squamules. Found in a well defined continuous area, stretching from southwestern Arizona through southeastern California throughout Baja California (Fig. 4c).

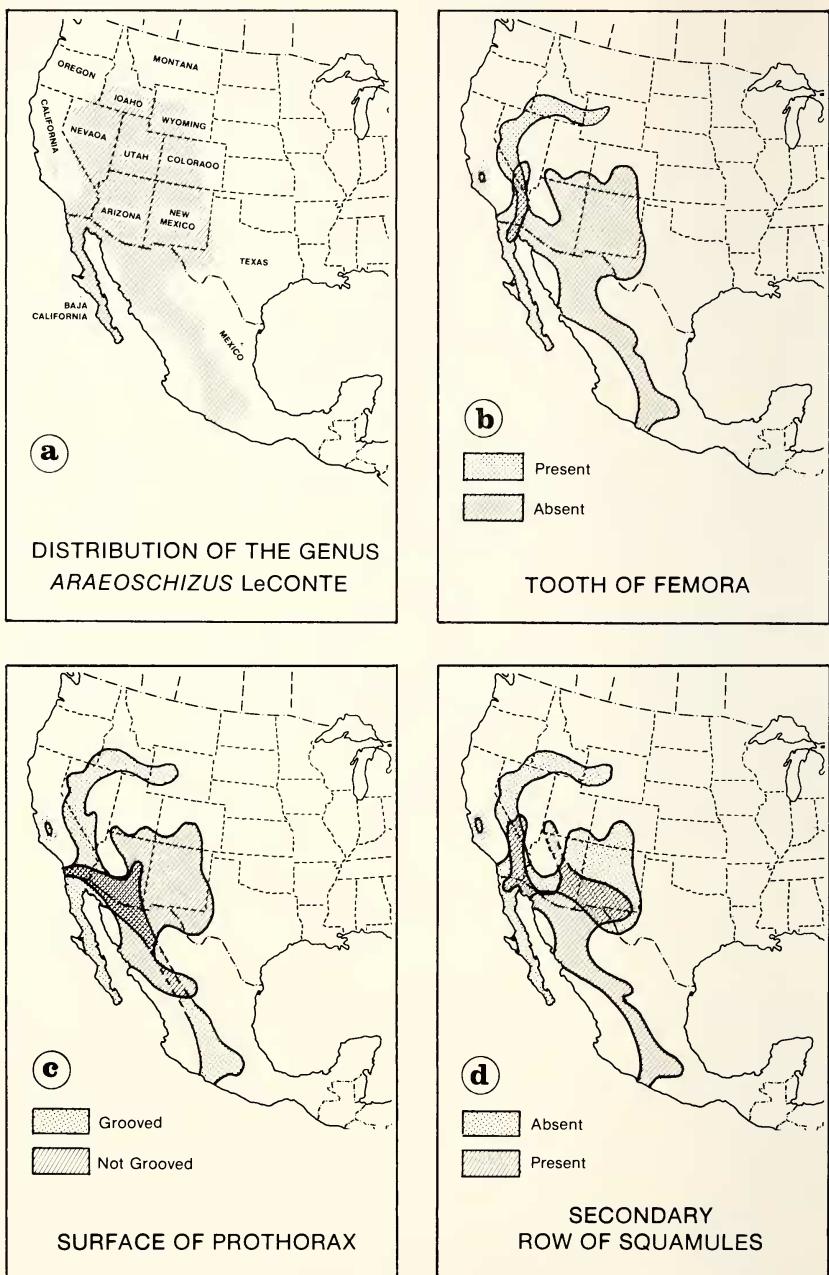


Fig. 3: Distribution of the genus *Araeoschizus* (a); and that of the variables of the three major morphological characteristics used in the key to species groups (b-d).

Group IV is very similar to Group III, except the secondary row of squamules are not present. The distribution pattern is exactly opposite to that of Group III, yet the northern end of its distribution is the same. Species of this group are the most widely spread, from as far north as the southern part of Nevada to the central portion of New Mexico (Fig. 4d). An isolated large population is found on the extreme eastern slopes of the Coastal Range in California (western border of the fertile San Joaquin Valley), I have not seen specimens belonging to this group from the immediate south of Chihuahua State in Mexico, yet further to the south they are represented again. They may represent another isolated group.

The major characteristic of the remaining two groups is the absence of the longitudinal groove on the prothorax. It should be noted that they are more or less present in the center section of the overall distribution of the genus.

Group V, where the secondary row of squamules are present (and that is where the type species of the genus, *costipennis* belongs), is found in a widespread area, from the most southern part of California eastward into Arizona, where its distributional pattern opens widely towards the North and South, reaching southeastern Utah and Colorado to the

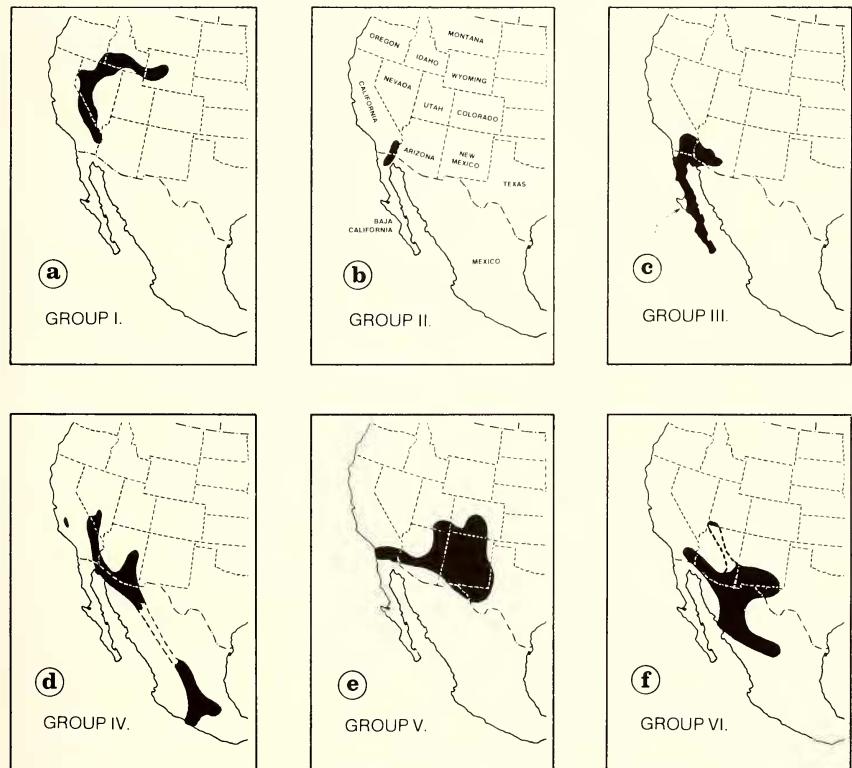


Fig. 4: Distribution of the six species groups of the genus *Araeoschizus*.

North, crossing the Rio Grande south of New Mexico and then turning northward into the extreme western part of Texas (Fig. 4e). There are very few specimens known from the extreme eastern border of their distribution.

Group VI. Similar to Group V, with the exception that the secondary row of squamules are not present. If there is one species (or group of species) to call the "primitive form", I certainly would label these belonging to this group as such. The distribution is centrally located if we take the presently known distribution area (Fig. 3a) into consideration (Fig. 4f). The absence of the femoral spine, the absence of the longitudinal groove on the prothorax, the absence of the secondary row of squamules, and in many cases the absence of squamular tufts (rosettas) near the posterior margin at the middle of the prothorax may reflect the characteristics of a primitive form.

It has been mentioned before, that I have used these three characteristics to establish the above mentioned groups of species. Initially it seemed to be a very "artificial" and "mechanical" way to sort more than 9,000 specimens upon which this study is based. After plotting the distributions on two sets of maps, one for the species and one for the corresponding group, I realized that the distribution of each group presents a distinct pattern for analysing the taxonomic characteristics, elevation, environmental conditions, etc. This may be a basis for further research, not just on biology, but also on evolutionary connections to other similarly sculptured relatives of this attractive genus in the tribe of Stenosini.

A Checklist and Distribution Summary of Species in the Genus *Araeoschizus* LeConte

Group I: Femora toothed. Prothorax with longitudinal groove. Elytral interspaces with squamules:

<i>airmeti</i> Tanner	USA: Idaho, Oregon, Nevada
<i>armatus</i> Horn	USA: California, Nevada
<i>duplicatus</i> Casey	USA: Wyoming
<i>lariversi</i> n. sp.	USA: California

Group II: Femora toothed. Prothorax with longitudinal groove. Elytral interspaces without squamules:

<i>hardyi</i> n. sp.	USA: California
<i>percellosus</i> n. sp.	MEXICO: Baja Calif. N.

Group III: Femora not toothed. Prothorax with longitudinal groove. Elytral interspaces with squamules:

<i>aalbui</i> n. sp.	MEXICO: Baja Calif. S.
<i>andrewsi</i> n. sp.	USA: California
<i>antennatus</i> Blaiddell	MEXICO: Baja Calif. N.

<i>elegantulus</i> n. sp.	MEXICO: Baja Calif. S.
<i>fimbriatus</i> Casey	USA: Arizona
<i>hystrix</i> n. sp.	USA: California
<i>interjectus</i> n. sp.	MEXICO: Baja Calif. S.
<i>lecontei</i> n. sp.	USA: Arizona
<i>limbatus</i> Blaisdell	MEXICO: Baja Calif. S
<i>squamulissimus</i> n. sp.	MEXICO: Baja Calif. N.
<i>wasbauerorum</i> n. sp.	MEXICO: Sonora

Group IV: Femora not toothed. Prothorax with longitudinal groove. Elytral interspaces without squamules:

<i>colossal</i> n. sp.	USA: Arizona
<i>dolenterus</i> n. sp.	MEXICO: Acantlan
<i>expeditionis</i> n. sp.	MEXICO: Cuencame
<i>mexicanus</i> Champion	MEXICO: Guerrero
<i>regularis</i> Horn	USA: Arizona MEXICO: Sonora
<i>simulans</i> Casey	USA: California
<i>sulcicollis</i> Horn	USA: California, Nevada
ssp. <i>disjunctus</i> n. ssp.	USA: California

Group V: Femora not toothed. Prothorax without longitudinal groove. Elytral spaces with squamules:

<i>apachensis</i> n. sp.	USA: Arizona
<i>costipennis</i> Le Conte	USA: California
<i>decipiens</i> Horn	USA: Arizona, New Mexico, Texas, Colorado
= <i>costipennis</i> Champ.	MEXICO: Sonora
<i>doyeni</i> n. sp.	USA: California
<i>exiguus</i> Casey	USA: California
<i>microcephalus</i> n. sp.	MEXICO: Chihuahua
<i>setosiformis</i> n. sp.	USA: Utah
<i>similaris</i> n. sp.	USA: New Mexico
<i>tenuis</i> Casey	USA: Arizona
<i>utahensis</i> n. sp.	USA: Utah

Group VI: Femora not toothed. Prothorax without longitudinal groove. Elytral interspaces without squamules:

<i>giulianii</i> n. sp.	MEXICO: Sonora
<i>haryorum</i> n. sp.	USA: Utah
<i>kaszabi</i> n. sp.	USA: California
<i>kubai</i> n. sp.	USA: Arizona
<i>problematicus</i> n. sp.	MEXICO: Zacatecas
<i>simplex</i> Casey	USA: Texas, New Mexico, Arizona
	MEXICO: Chihuahua

Terminology

All species of the genus *Araeoschizus* are beautifully sculptured beetles with great variety in detail, not only in the shapes of certain body parts, but also the size, shape and form of the squamules. In order to keep uniformity in the descriptions, I present below five drawings with topography and explanations of the names I used in the descriptions. Basically these are adapted from Koch (1955), however, many new definitions are added.

As mentioned before, *Araeoschizus* resembles other genera of the Stenosini (Fig. 5). In the Western Hemisphere only one genus *Grammicus*, may be mistaken for *Araeoschizus*, however the proportions of the head-prothorax in relation to the elytra is strikingly different. The Old World has other similar looking genera, of which I sampled two, *Tetranosis* and *Stenosethas*. Establishing a usable terminology for similar genera, may help others to construct terminologically more uniform descriptions.

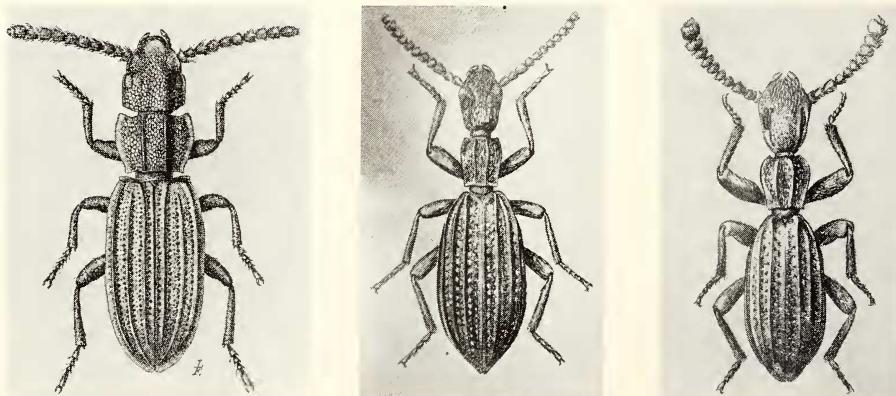


Fig. 5: Generic examples of some Stenosini resembling and mistaken for *Araeoschizus*. Left to right: *Grammicus latus* Kaszab (1969:309) from Chile; *Tetranosis topali* Kaszab and *Stenosethas carinipennis* Kaszab (1975:10) both from India.

All the drawings, representing certain parts in different views of the beetle's body, are accompanied by scanning electron micro photographs depicting areas in actuality, demonstrating not only the beautifully sculptured surface, but also illustrating some of the very minute details which may be described only in four to five words.

To Figs. 6 and 7: The shape of the head and prothorax, their ratio (independently or combined) to that of the hind body has paramount importance in identification. The cuticle of the head is usually smooth, having minute pore-like punctures between the squa-

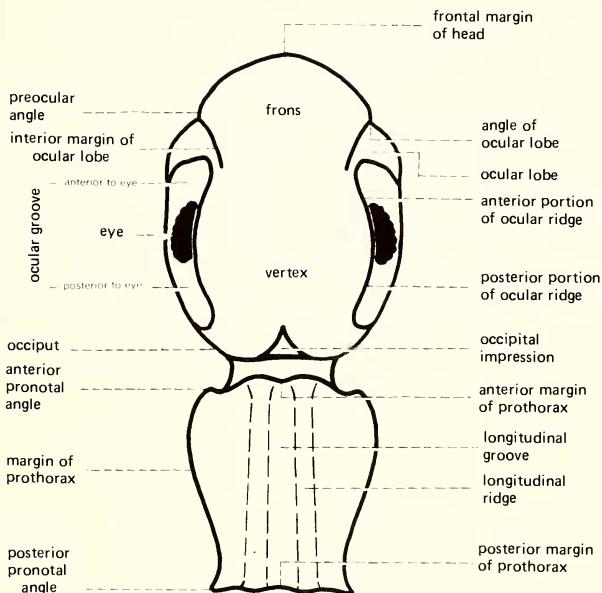


Fig. 6: Terminology of the head and prothorax of *Araeoschizus*.

mules. If there are large punctures they are usually at the base of squamules which are lost. It is characteristic that the frontal margin of the head is denticulate, occasionally with singularly pointed (Fig. 7a) or two-pointed (b) denticles. The surface of the denticles and the immediate surface at the margin have a distinct honeycomb-like surface, which at the posterior border is outlined with forwardly decumbent, sharply pointed, curved setae. The area posteriorly is then smooth, only the deep pits of the squamules and a very few minute pores are present.

The prothorax is variable not only in shape, but also in surface characteristics, which are demonstrated in Figs. 7c and 7d, in two species belonging to different species group. In *sulcicollis* (c) the longitudinal groove of the prothorax is somewhat deeper than in *andrewesi* (d) and its surface is microscopically more granulose. The length and density of squamules are characteristic. Margins, including these of the longitudinal groove are always squamulose, in most cases in an unorganized manner, e. g. some anteriorly (in anterior half) others posteriorly (in posterior half) decumbent or recumbent and they usually

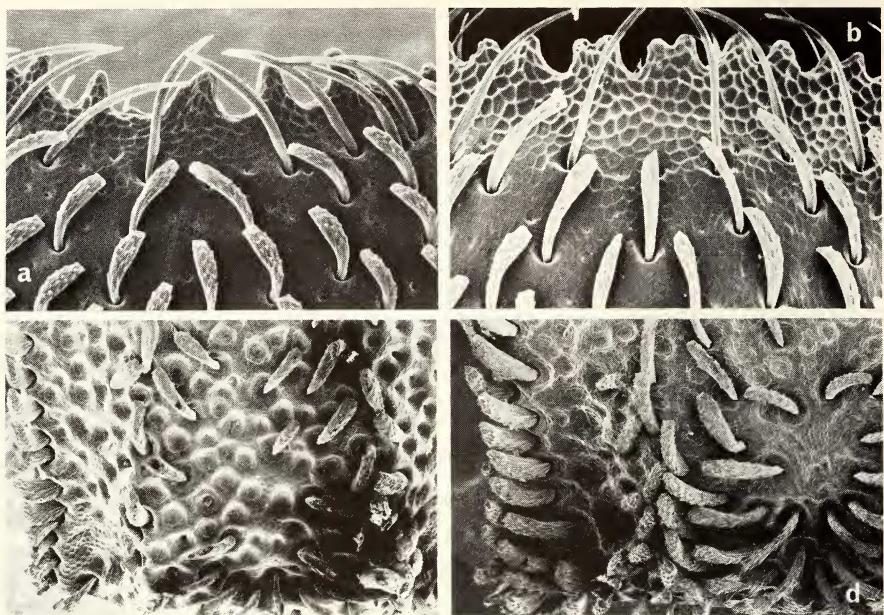


Fig. 7: *A. sulcicollis* (left) and *andrewsi* (right): a and b frontal margin of head with variable annulation, structure of surface and shape of squamules ($215\times$); c and d posterior left pronotal angle including the center portion of posterior margin ($200\times$).

originate in a much larger and flatter pit than found on the head. They are always denser on the posterior end of the margin, where frequently several rows of squamules are present, and in these cases the posterior cuticular angle is hard to outline. In most of the cases a rosette-like arrangement is detectable at the middle of the posterior end of the longitudinal groove. In most cases the cuticle is punctulate or granulose, occasionally the combination of both. Very seldom smooth, with a slight indication of either of the above.

To Figs. 8 and 9: Viewing the head from the side reveals the shape of the ocular lobe and the ocular groove (Fig. 9a-d) and the labial area (a, b). As seen here the area is squamulose in *sulcicollis* (a) and covered with hairlike fine bristles in *andrewsi* (b). The anterior portion of ocular groove usually smooth, posterior deeply (a) or shallowly (b) punctured. This view also exposes the divided eyes, the position of the ventral portion to that of the dorsal is seen in our samples and also exposes the presence (c) or absence (d) of the rounded suture where the posterior margin of the ocular lobe is fused with the anterior margin of the head exactly between the dorsal and ventral portion of eye (see c, d). The surface of the side varies a great deal as seen immediately behind the ventral portion of the eye; it is roughly punctured in *sulcicollis* (c) and smoother in *andrewsi* (d). Note the shape, length and density of the squamules on c and d; they are more numerous and much longer in *andrewsi* (d).

The sides of the prothorax do not reveal great differences, except the density and size of the punctures on the mostly smooth surface (e, f). Useful in determining the curvature

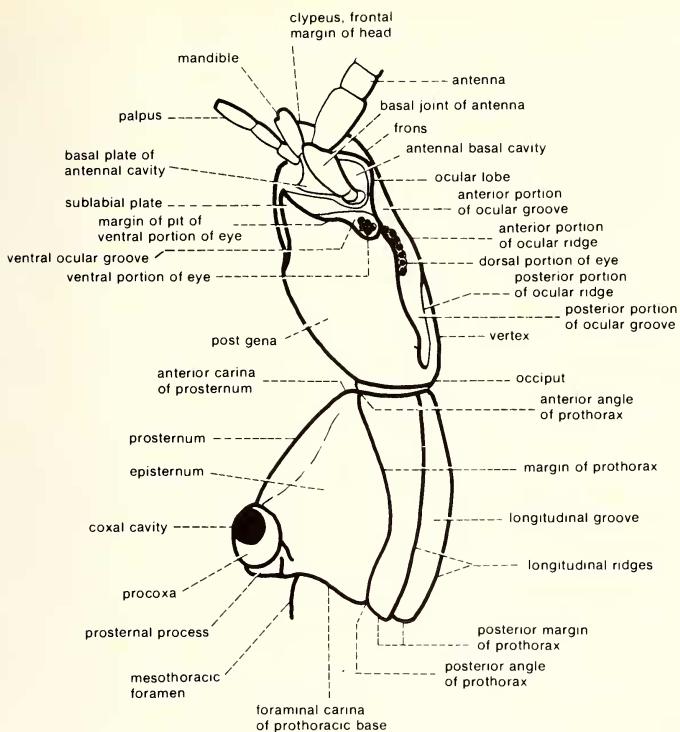


Fig. 8: Terminology of the head and prothorax of *Araeoschizus* (side view).

of the anterior portion of the mid-surface which is sometimes straight as in *sulcicollis* (e) or slightly curved, as in *andrewsi* (f).

To Figs. 10 and 11: Many morphological characteristics are found on the ventral portion of the head, among them the shape and proportion of the proboscis of the sublabial plate, which is short in *sulcicollis* (Fig. 11a) and long in *andrewsi* (b). The mentum is in most cases broader than long, as seen on a and more rounded in *andrewsi* (b); its surface structure has a variety, but most cases it is deeply (a) or shallowly (b) punctured, always squamules present and they are longer here than anywhere on the head.

The gular area is exposed on c for *sulcicollis* and on d for *andrewsi*. Characteristics of its surface are used in most cases since its structure differs a great deal within the same species group. The surface is usually very minutely granulose, it could easily be called smooth, as in *sulcicollis* (c), or roughly granulose and horizontally ridged, as in *andrewsi* (d). The nearby surface structures also reveal important characters.

The prosternal process (e, f) is the most important part on the prothorax. Its shape, incidentally does not vary a great deal, except its posterior process which laterally could be straight as in *sulcicollis* (e), or constricted as in *andrewsi* (f). The margin of the prosternal process is always squamulose, occasionally varying within the same species by having a

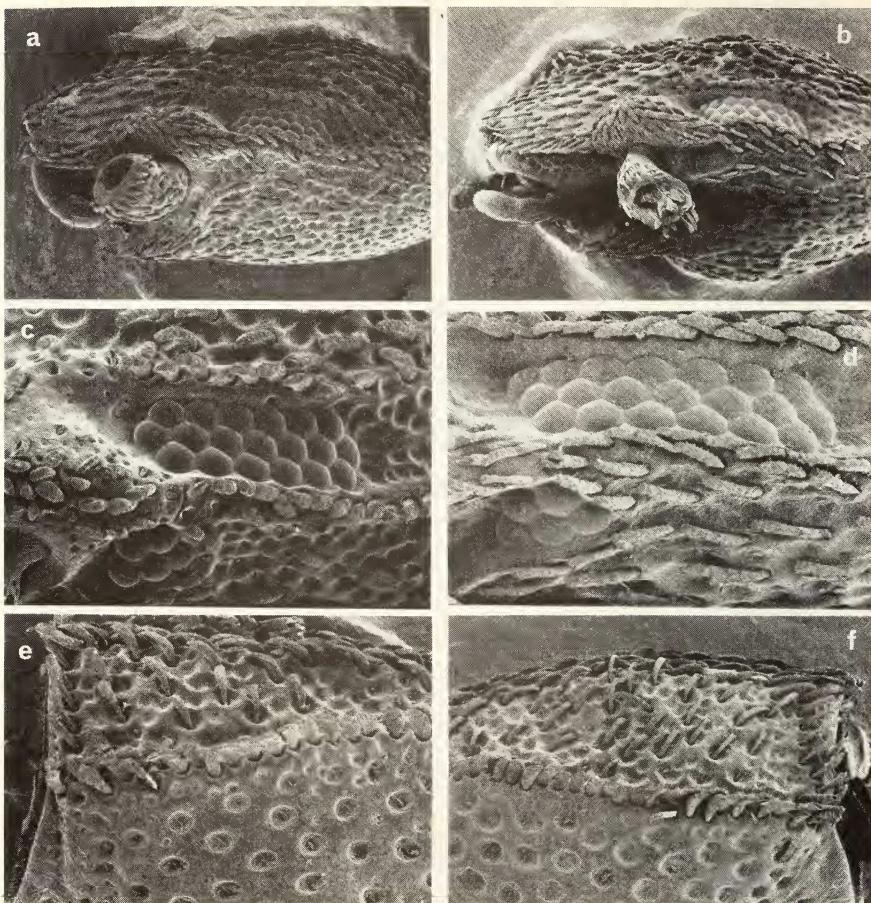


Fig. 9: Side view of head (a-d) and portion of prothorax (e, f) of *A. sulcicollis* (left) and *andrewsi* (right): a and b overall view of head (60 \times); c, d the devided eyes (135 \times); e left, and f right anterior pronotal angle (110 \times).

greater or lesser number of squamules; very few, or none, at its inner surface, which in most cases appears smooth. The procoxa always has a very few hair-like squamules sunken into small, deep punctures sporadically spaced on the finely, minutely honeycombed surface.

The ventral side of the hind body displays a great variety of morphological characteristics so typical for the species (Figs. 12 and 13). Fig. 15 shows the anterior half of the abdomen of *sulcicollis* (a) and *andrewsi* (b), and the posterior half (c and d, respectively) of the same.

To Figs. 12 and 13: The ventral side of the hind body displays a great variety of morphological characteristics so typical for the species. Fig. 15 shows the anterior half of the abdomen of *sulcicollis* (a) and *andrewsi* (b), and the posterior half (c and d, respectively), of the same.

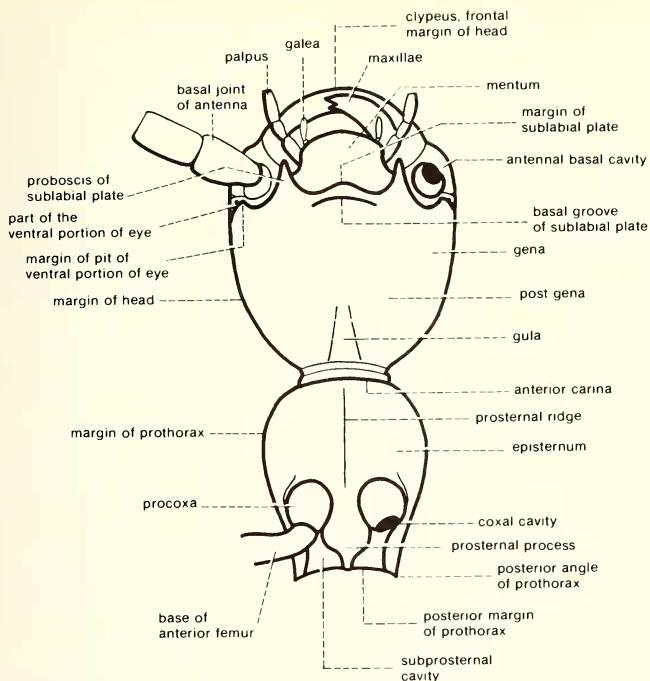


Fig. 10: Terminology of the head and prothorax of *Araeoschizus* (ventral view).

The shape of the mesosternal process varies a great deal. Its posterior end is flat (*a*) or rounded (*b*) as demonstrated in our two examples. The episternum of the mesosternum is fused with a slight trace visible (*a*) or absent (*b*). This can be detected in *sulcicollis* (*a*) if we draw a line on the right hand side of the photo starting at the right middle of the mesocoxa where the fused rounded end of this borderline is still visible, parallel to the edge of elytra towards the middle of the area between elytral margin and that of metaxoca (*a*). This line is not visible in *andrewsi* (*b*). The outline of the intercoxal process of the abdomen has different shapes. In *sulcicollis* (*a*) it is flatly rounded, yet in *andrewsi* (*b*) it is almost triangular, in most cases with a flat tip (*b*). The size of the punctures, the distance between them, and the length of the squamules are useful characters.

The posterior margins of abdominal segments 2, 3 and 4 also vary a great deal, in many cases even within the same species. The margin of the second segment is usually flat (*c*) or anteriorly slightly bowed medially (*d*); that of the third is more anteriorly rounded medially, where the segment is much broader in *sulcicollis* (*c*) than in *andrewsi* (*d*). Another characteristic is the placement of the squamules. On the hind body all the squamules are posteriorly decumbent, generally orderly arranged. However, there is a difference near the margins of the abdominal segments, where in some species the squamular band is present, e. g. the squamules are arranged in an orderly manner parallel to the margin as in *andrewsi* (*d*), or not so, as in *sulcicollis* (*c*).

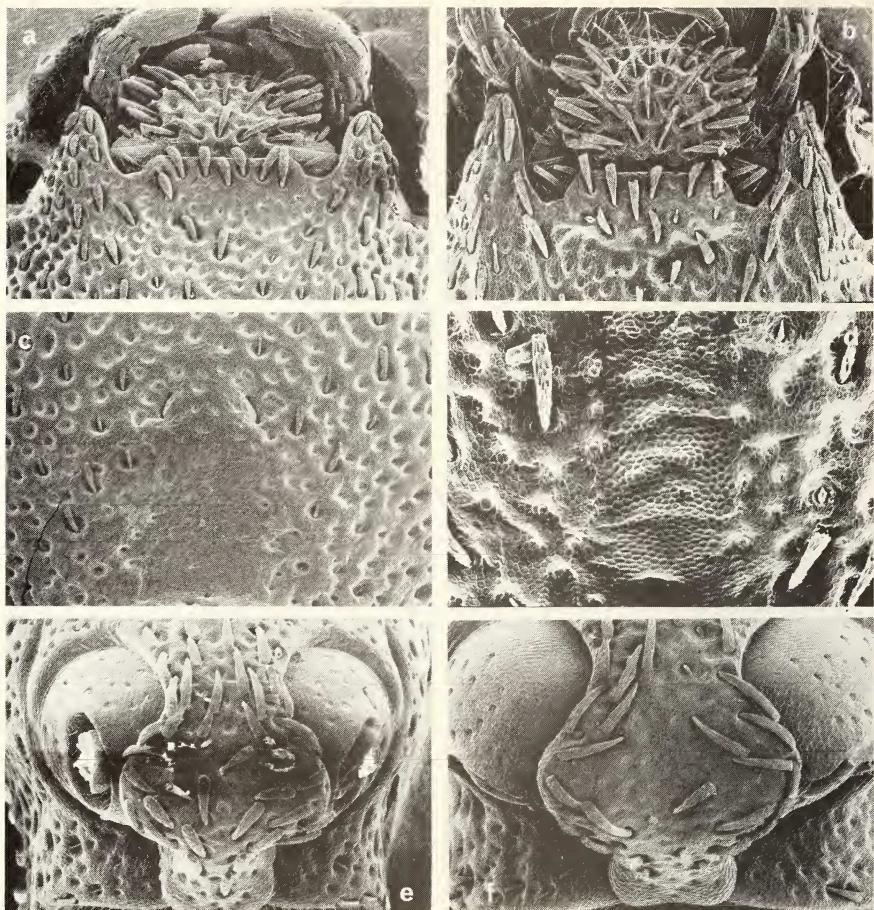


Fig. 11: *A. sulcicollis* (left) and *andrewsi* (right); a, b anterior ventral portion of head (110 \times and 80 \times respectively); c, d the gular area, extreme variations in surface structure (160 \times , 165 \times respectively); e and f ventral portion of prothorax, prosternal process (160 \times).

The site of the punctures, their density, the ratio between their diameter and the distances between punctures are characteristic for some of the species. Punctures are less dense and smaller (in *sulcicollis* [c]) or larger and more dense (like in *andrewsi* [d]). In many species small, deep, minute punctures (pores) are intermixed with the large ones (c); or are sparse (d) or in many cases absent.

To Figs. 14 and 15: One of the three major characteristics in separating specimens into groups (I-VI) is the presence or absence of the secondary row of squamules on the elytra. This is clearly demonstrated on Fig. 15, where *sulcicollis* (a) has not, and *andrewsi* has secondary rows of squamules. The curvature of the humerns is used many times in species descriptions, especially between closely related species. This is broadly

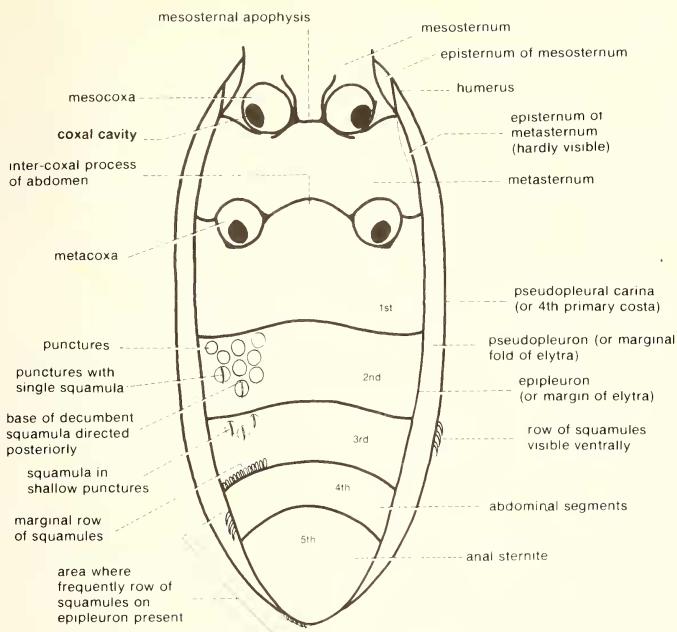


Fig. 12: Terminology of the hind body of *Araeoschizus*.

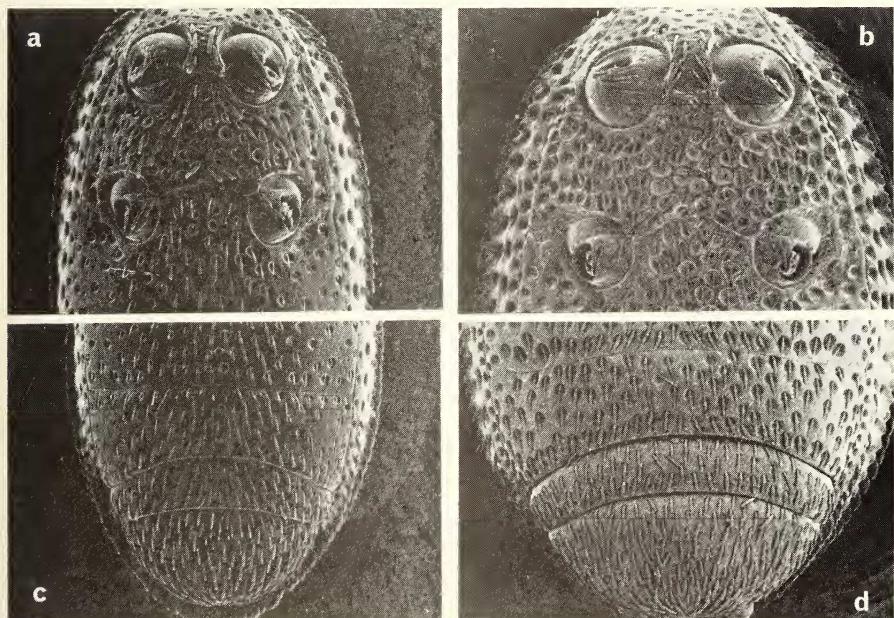


Fig. 13: Hind body of *A. sulcicollis* (left) and *andrewsi* (right); a, b mesosternum and metasternum; c, d the 3rd, 4th and 5th abdominal segments (all 35 \times).

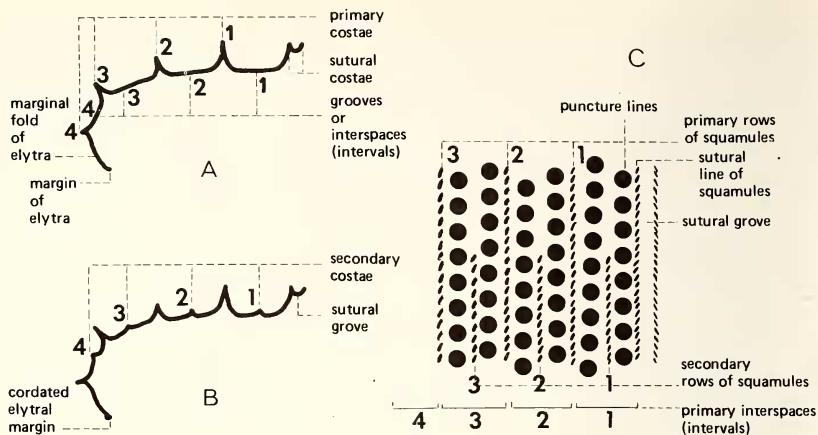


Fig. 14: Terminology of the structural features of elytra in *Araeoschizus*.

(more or less like in *sulcicollis*) or narrowly rounded (more or less like in *andrewsi*). There are species with more broadly rounded shoulders (like those in Group I) or with more narrowly rounded shoulders (like some species in Group V and VI).

The size of the punctures and the distance between them is mentioned quite frequently and is a good characteristic. However, many species have sharply-edged punctures like *sulcicollis* (c) (which shows up on a), in many cases the edges are not sharp, like in

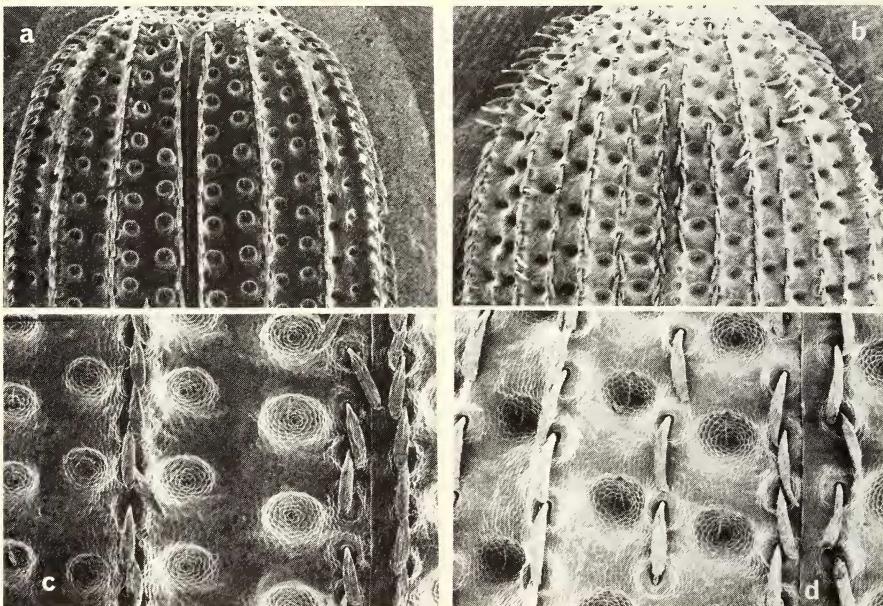


Fig. 15: Dorsal view of elytra of *A. sulcicollis* (left) and *andrewsi* (right); a, b typical examples of interspaces without squamules (a) and with squamules (b, both 50 X); portion of same on c and d (160 X).

andrewsi (d). Punctures usually have a micro-seta originating on the anterior portion of the inner wall of the puncture, which is visible in the figure of *andrewsi* (d). The surface between the two puncture lines within the two primary costae is smooth medially (c), or is a longitudinal area which is taken over by the secondary row of squamules (d) and consequently the surface – in general – appears to be finely granulose. The squamules on the elytra, as a rule, are posteriorly recumbent or decumbent throughout (a), occasionally semierect around the shoulder area (not illustrated; several species of Baja California, Mexico), and quite frequently disturbed by handling the specimen (b).

Key to the species groups of the genus *Araeoschizus* LeConte

In the following key I have used three major characteristics to separate the species groups: (1) the presence or absence of femoral spines; (2) the presence or absence of the longitudinal groove on the prothorax; and (3) the presence or absence of the secondary rows of squamules in the elytra interspaces. For the general distribution of each group refer to Fig. 4.

- 1 Femora toothed (Fig. 17a) 2
- Femora not toothed (Fig. 17b) 3
- 2 Prothorax with longitudinal groove (Fig. 17c):
 - a) Elytral interspaces with squamules (Fig. 17e) Group I
 - b) Elytral interspaces without squamules (Fig. 17f) Group II
- 3 Prothorax with longitudinal groove (Fig. 17c):
 - a) Elytral interspaces with squamules (Fig. 17e) Group III
 - b) Elytral interspaces without squamules (Fig. 17f) Group IV
- Prothorax without longitudinal groove (Fig. 17d):
 - a) Elytral interspaces with squamules (Fig. 17e) Group V
 - b) Elytral interspaces without squamules (Fig. 17f) Group VI

Key to the species in Group I.

- 1 All femora toothed 2
- Hind femora not toothed 3
- 2 Margins of prothorax not constricted before posterior angle; tufts of squamules at posterior end of longitudinal groove present. Length: 4.5–4.9 mm. (S. Idaho, NW Nevada, SE Oregon) *airmeti* Tanner
- Margins constricted; tufts not present. Length: 3.9–4.1 mm. (SW. Nevada, Mono and Inyo Co. in California) *armatus* Horn
- 3 Shoulders twice as wide as width of prothorax at base. Tufts narrowly separated. Length: 3.9–4.1 mm. (Central SW Wyoming) *duplicatus* Casey
- Shoulders less than twice as wide as width of prothorax at base. Tufts broadly, deeply separated. Length: 4.0–4.3 mm. (E San Bernardino Co., California) *lariversi* n. sp.

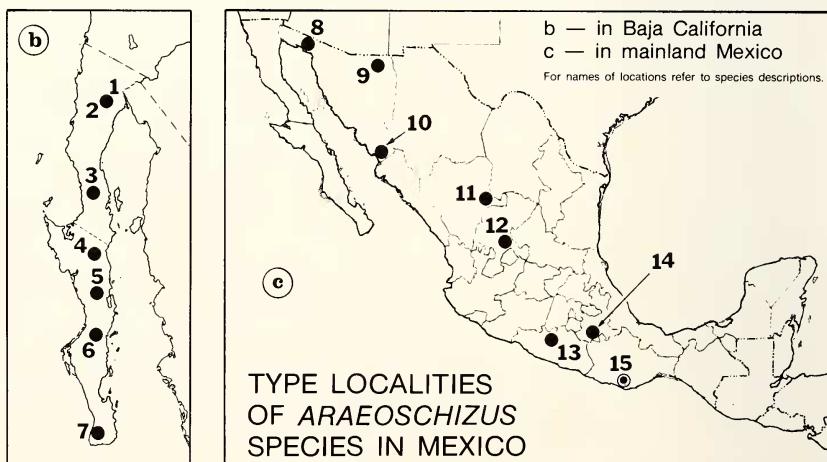
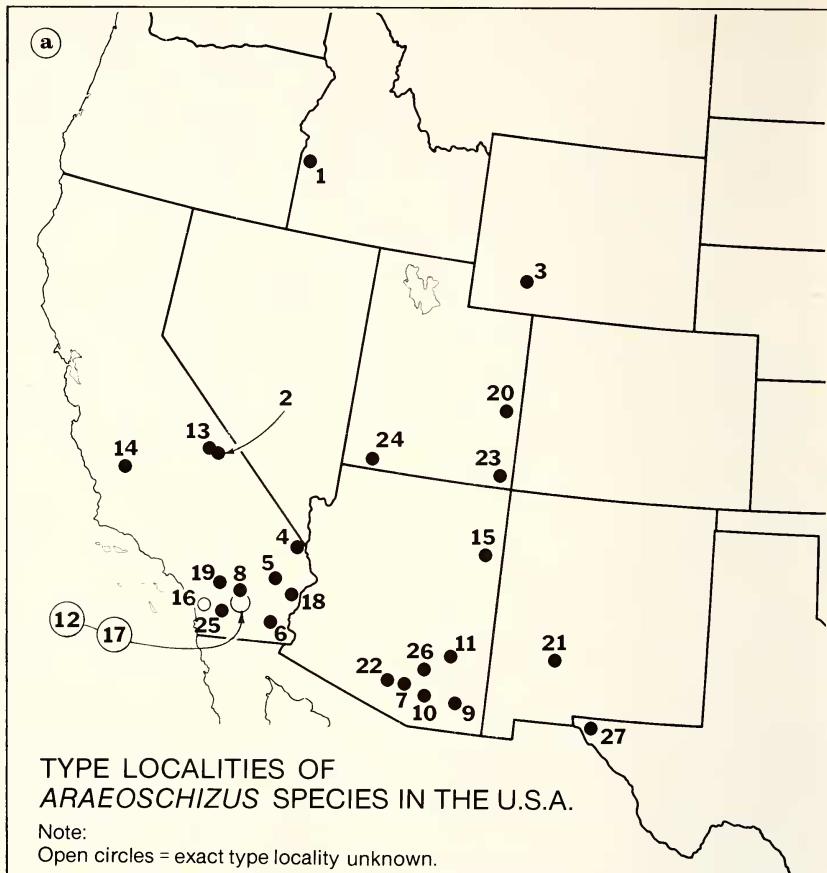


Fig. 16: Type localities of *Araeoschizus*. For identification refer to list on opposite page.

Explanation to Fig. 16

Type localities in the United States (a):

1 = <i>airmeti</i>	10 = <i>colossalisis</i>	19 = <i>exiguus</i>
2 = <i>armatus</i>	11 = <i>regularis</i>	20 = <i>setosiformis</i>
3 = <i>duplicatus</i>	12 = <i>simulans</i>	21 = <i>similaris</i>
4 = <i>lariversi</i>	13 = <i>suicollis</i>	22 = <i>tenuis</i>
5 = <i>hardyi</i>	14 = ssp. <i>disjunctus</i>	23 = <i>utahensis</i>
6 = <i>andrewsi</i>	15 = <i>apachensis</i>	24 = <i>hardyorum</i>
7 = <i>fimbriatus</i>	16 = <i>costipennis</i>	25 = <i>kaszabi</i>
8 = <i>hystrix</i>	17 = <i>decipiens</i>	26 = <i>kubai</i>
9 = <i>lecontei</i>	18 = <i>doyeni</i>	27 = <i>simplex</i>

Type localities in Mexico; Baja California (b), and mainland Mexico (c):

1 = <i>squamulissimus</i>	7 = <i>limbatus</i>	13 = <i>mexicanus</i>
2 = <i>percellosus</i>	8 = <i>wasbauerorum</i>	14 = <i>dolenterus</i>
3 = <i>antennatus</i>	9 = <i>microcephalus</i>	15 = One minute specimen
4 = <i>elegantulus</i>	10 = <i>giulianii</i>	from Copala (need veri-
5 = <i>aalbui</i>	11 = <i>expeditionis</i>	fication) not included
6 = <i>interjectus</i>	12 = <i>problematicus</i>	in this study.

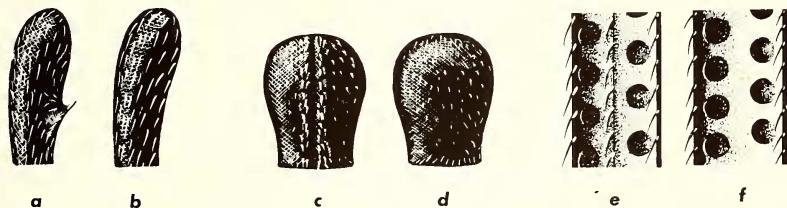


Fig. 17: Morphological characters used in separating the species groups. - a-b femora, c-d prothorax, e-f elytral interspaces.

Araeoschizus airmeti Tanner, Figs. 16a and 18

Tanner, The Great Basin Naturalist, 6 (1-4), 1945:125-126.

Similar to *armatus* Horn, from which it differs by the broader humeral area, by the broad prothorax and by the parallel-sided body. Differs from *duplicatus* Casey in that the latter has a more rounded prothorax and larger spines on all femora. Reddish-brown; robust.

Head - Large, slightly longer than broad across ocular lobe. Preocular angle entire (e. g., sides of frons parallel), frontal margin of head evenly, flatly rounded, at middle with 2-3 shallow annules, with several pale, forward protruding bristles of different length. Ocular lobe not prominent on horizontal plain, slightly elevated at middle. Ocular ridge highest at level of middle of eye, gradually sloping posteriorly, fading gradually at hind margin of shallow, short posterior half of ocular groove. Surface densely punctate

with large, flat punctures; sparsely covered with decumbent club-shaped squamules; more squamulose on ocular lobes, ocular ridges. Frons almost smooth, with few small punctures. Eyes elongate, much narrower than long; 19 facets drosally, 5 ventrally; facets relatively small. Antennae narrow, loosely jointed, as long as distance from basal joint to posterior fourth of prothorax. Joint 1, about same size as 2; 3 shorter than 2, longer than 4; 4-9 about same size; 10 widest, compressed horizontally, as long as 3; 11 shortest, half as wide as 10. Sparsely to densely squamulose, squamules not longer than joints where they originate (several specimens with very sparsely squamulose antennae).

Prothorax. — Broader than long; anterior angles narrowly rounded, sides not constricted before posterior angle. Surface coarsely punctate, moderately densely covered with narrow, suberect squamules (frequently rubbed off) in tufts at posterior end of shallow longitudinal groove. Middle surface slightly compressed, flat anteriorly, groove well visible posteriorly. Margin with row of short, erect, yellowish squamules; cuticle on edges

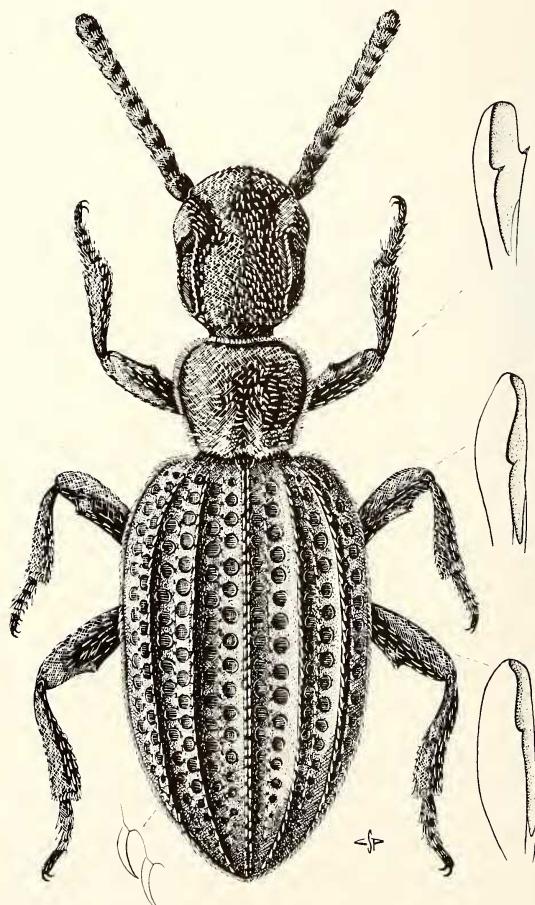


Fig. 18: *Araeoschizus airmeti* Tanner.

darker brown, almost black. Some specimens from Idaho Falls, ID (in CDFA) have complete squamular arrangement, where margins covered with long, straight, narrow squamules.

Elytra. – Nearly 3.5 times longer than prothorax, 1- $\frac{3}{4}$ times longer than wide at middle. Sides parallel about middle third, shoulders angularly, posterior end pointedly, narrowly rounded. Primary cordae slightly more elevated than secondaries, each with row of sharply pointed, posteriorly curving, decumbent, pale, overlapping squamules. Surface at middle flat, slightly compressed. Interspaces with row of prominent, large, deep punctures; distance between punctures less than half diameter of puncture. Puncture lines gradually smaller behind posterior fourth, continuing into posterior end of groove. Primary corda 2 slightly shorter than 1, which does not reach tip of elytra. Secondary corda 1 longest, 2, 3 shorter, of even length at posterior end; 3 shortest anteriorly, originating behind shoulder. Scutellum deeply set, margin sharply separated. Marginal fold of elytra not cordated; with small, shallow punctures throughout.

Underside.

Head. – Less coarsely punctured than dorsal side; uniformly covered with forwardly decumbent, flatly pointed pale squamules. Frontal edge of mentum straight, corners angularly rounded; surface finely granulose, sparsely squamulose. Labial palpus joint 1 short, 2 longer; 3 about same length much broader; anterior edges of 1, 2 sparsely squamulose; tip of 3 pale, flattly narrowing. Labial palpus light-brown, broad at middle. Mandibles broad, blackish-brown. Proboscis of Submentum plate sharply pointed, sides curved exteriorly; inner base deeply carinate, margin of sublabial plate between process slightly concave; margins blackish-brown; surface sparsely punctured, with few pale squamules especially on and around basal groove of sublabial plate. Gula smooth, with two deep impressions at anterior clarity. Antennal fossa deep; margin of pit of ventral portion of eye sharply elevated, angularly curved; facets not deep set.

Prothorax. – Hypomeral surface with very large, closely spaced, shallow punctures, very sparsely to sparsely squamulose. Prosternum slightly elevated, somewhat smoother, less punctured, more squamulose. Prosternal process minutely punctured; darker margins with short, decumbent squamules; sides broadly rounded in posterior half.

Hind body – Mesosternum, metasternum, abdominal segment 1 densely covered with large, flat, sharp-edged punctures; punctures with long, flat, narrow, posteriorly decumbent pale squamules, each longer than diameter of punctures. Mesosternal process parallel sided, tip flatly convex, margins squamulose. Metasternal process long, broadly rounded; margin blackish-brown, surface more densely squamulose than that of mesosternum. Abdominal segment 2 with smaller punctures than 1; size of punctures decreases posteriorly; 5 almost smooth. Segments sparsely covered with posteriorly decumbent narrow, pale squamules; more so on 1, marginal portions of 4, 5.

Legs – Relatively short; front, middle about same size, hind largest. Anterior edge of dorsal side of frontal femur; posterior edge of dorsal side of middle, hind legs with well visible curvature about middle, each with squamular spines; longitudinal groove deep,

broad, shorter on frontal femur, narrower, longer on hind; sparsely covered with narrow, long squamules. Tibiae, tarsi with much shorter squamules, more closely spaced. Tibial collar (margin of posterior end of tibia) with short, pointed, spine-like squamules.

Length: 4.5–4.9 mm.

Distribution.

Holotype: Idaho, Canyon County, Nampa, April 1944, coll. by E. L. J. Airmet, BYU.

Paratypes: 12 paratypes in BYU; 1 in CDFA, same location. Additional specimens:

Idaho – Idaho Falls, Bonneville County, V. 19. 1966; V. 22. 1966; VI. 28. 1966; VIII. 27. 1966, total of 9 specimens (UMC). Elmore County: Glenn's Valls, IX. 15. 1934, O. Bryant (CAS) 3 specimens; King Hill, IX. 15. 1934, O. Bryant (CAS) 1 specimen; 5.5 mi. E Hammett, VI. 19. 1967, R. R. Snelling (LACM) 7 specimens, ex colony of *Pheidole oregonica*; Glenns Ferry, III. 8. 1933, D. E. Fox (USNM) 5 specimens. Canyon County: Parma, IV. 8. 1930, L. P. Lanchester (UIM) 6 specimens, same data (OSU) 4 specimens; II. 24. 1930 (FM) 1 specimen. Cassia County: 7 mi. E Malta, IV. 14. 1954, W. F. Barr (1 spec.), 6 mi. SE Malta, VI. 11. 1963 (1 spec.), W. F. Barr (UIM); IX. 1. 1962, with a note "attracted to black light", W. F. Barr and C. B. Hewitt (UIM) 1 specimen; 7 mi. SE Malta, in harvester ant nest, W. F. Barr (UIM), 1 specimen. Owehee County: 3.3 mi. S Givens Hot Spring, ex colony of the ant *Pheidole creightoni*, R. R. Snelling (LACM) 1 specimen; 2 mi. NW Oakley, 4800 ft. (OSUC) 1 specimen. Butte County: "A.E.C., N.R.T.S." ex colony of the ant *Vermanessor lobognatus*, no data, by G. H. M. (OSU), 1 specimen. Jerome County: Snake River Canyon, Blue Lake, IX. 22. 1976, A. O. Allen (UCR), 2 specimens. Fremont County: Rexburg, V. 1919, E. Quayle, locality data by Tanner (1945:125).

Oregon – Malheur County: Junction of Hwys. 78 and 95, from the nest of *Vermanessor lariversi*, VIII. 27. 1968, A. C. Cole (LACM), 3 specimens.

Nevada – Humboldt County: 2 mi. N Golconda "sifting under *Sarcobatus*", IV. 29. 1966, C. W. O'Brien (UCB) 5 specimens. Pershing County: 10 mi. S Lovelock, V. 13. 1951, I. La Rivers (DAN), 21 specimens.

***Araeoschizus armatus* Horn, Figs. 16a and 19.**

Horn, Trans. Amer. Philos. Soc., 14(64), 1870:275; Trans. Amer. Ent. Soc., 17, 1890:314, and 343 – Casey, Proc. Wash. Acad. Sci., 9, 1907:490.

This species is closely mistaken for *duplicatus* Casey, to which it is closely related. Easily differentiated by the shape of the head; the prothorax not rounded anteriorly, and the absence of the tufts at its base; the much narrower shoulders, and the non-parallel sides of the body.

Head – Large, one-fifth to one-fourth longer than prothorax. Broadest across not prominent ocular lobes. Sides straight, slightly inwardly projecting posteriorly. Occipital angle sharp, very prominent; posterior margin straight. Surface densely punctulate,

between punctures smooth; each puncture with forwardly decumbent, short, clubshaped squamule; those toward front, sides of head slightly more erect, somewhat longer. Interior margin of preocular lobe very prominent, deeply set, partially black. Ocular ridge not highly elevated, prominent, due to deep impression at continuation of posterior section of interior margin of flatish ocular lobe; edges about eye level, behind, with dense row of erect short squamules. Eyes not deeply set; anterior portion of ocular groove shallower than posterior. Eyes small, 18–19 facets dorsally, 4–5 ventrally. — Antennae slender. Joint 1 broadest, longest, broader than 2; 3 narrower than 2; 4 slightly broader than 5; 5–9 about same length; 10 twice as long, slightly broader than 9; 11 short, half diameter of 10; pointed. Joints usually well separated; anterior portion of each joint with row of erect, forwardly protruding short, pale yellow squamules (fresh specimens with squamules more numerous, not rubbed off, so antennae may appear more compact, joints appear not well separated).

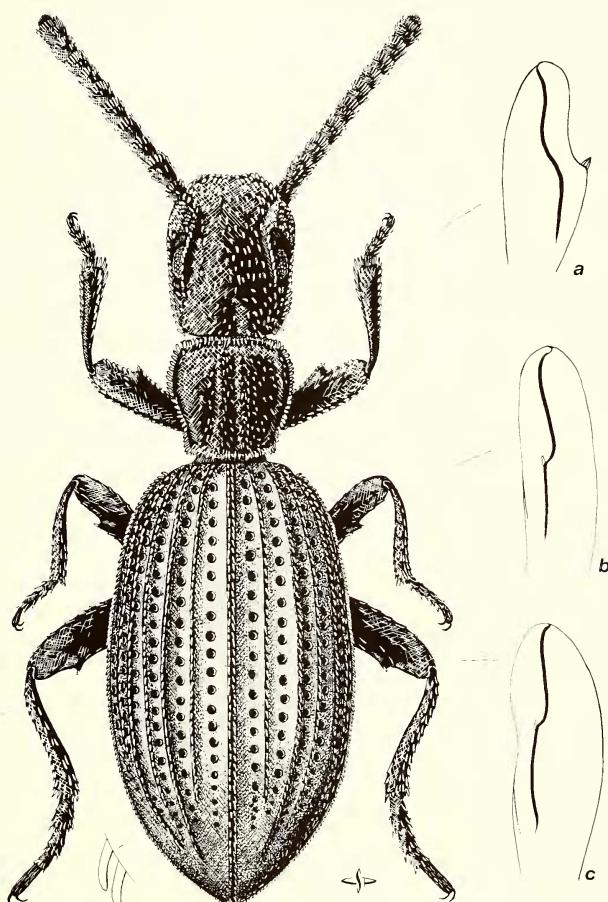


Fig. 19: *Araeoschizus armatus* Horn

Prothorax. — About one-fourth shorter than broad; as long as broad at broadest point. Frontal margin flatly rounded; anterior angle prominent; broader in anterior third; sides gradually narrow in posterior two-thirds; sides before prominent posterior corners slightly constricted. Longitudinal groove at middle prominent. Surface very roughly granulate-punctate, with numerous, disorderly spaced, erect to suberect, short, club-shaped squamules. Edges with row of squamules; those on anterior third of sides longer.

Elytra. — One-and-one-half times longer than head and prothorax combined; anterior half narrower. Shoulders narrow. Primary cordae prominent; secondaries shallow. Puncture lines in interspaces shallow, punctures small, with sharp edges. Cordae with row of posteriorly decumbent, slightly curved, roundly pointed, pale yellow squamules, squamules shorter than on anterior portion of margin of prothorax; not touching. Squamules on secondary rows more decumbent, flat on body, much shorter than on primaries. Surface between puncture lines very finely granulose.

Underside.

Head. — Four well defined, sharp-edged annules on center of convex frontal margin of head well visible. Maxillary palpus large, if straighten terminal joint well visible in dorsal view; light brown (especially terminal joint) to pale yellow. Labial palpus short, lighter in color. Surface very coarsely punctured, nearly granulate; genal, post genal area sparsely covered with short, forwardly decumbent pale squamules. Gular area very broad, evenly covex; triangular impression reaches forward half way to sublabial plate. Sublabial plate narrow, its process sharply inwardly pointed; base of process deeply carinate; edges blackish. Basal groove of sublabial plate straight, slightly impressed at middle.

Prothorax. — Very densely covered with large, irregularly shaped, shallow punctures. Frontal margin broadly, sides narrowly black, otherwise dark brown. Only broadly rounded prosternal ridge, broad prosternal process, covered with posteriorly decumbent, flat, pale squamules.

Hind body. — Smooth, sparsely covered with shallow, small punctures, each with very narrow, long, decumbent, pale yellow squamules, which are longest on episternum, first abdominal segment. Marginal row of squamules present. Segments 4, 5 densely squamulose, minutely, densely punctured. Margins of segments blackish-brown. Elytral margin not dordated. Posterior end of epipleuren to tip of elytra with row of sparsely spaced, short squamules.

Legs. — Middle pair shortest, posterior largest. All femorae with one spine on the dorsal side of middle. Spines more porminent on front pair, less so on posterior. Femoral groove deep, longer than half of length of femora. Legs sparsely covered with flat, decumbent, pale yellow squamules. Tarsal joints in relation to thickness of femora thin, each joint with verry few squamules.

Length: 3.2–4.0 mm.

Distribution.

Holotype: "CAL.", in MCZ, No. 8003.

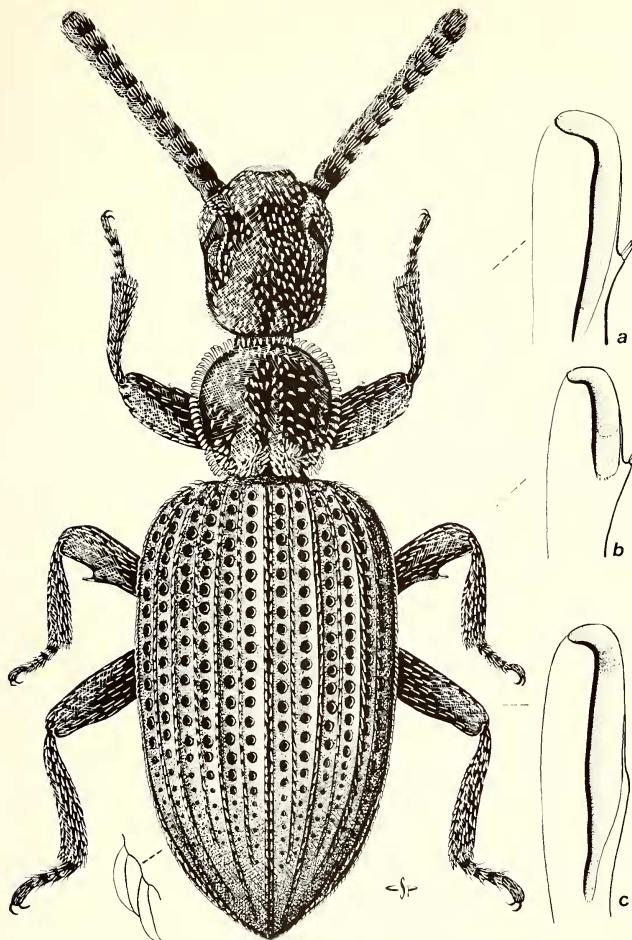


Fig. 20: *Araeoschizus duplicatus* Casey

Additional distribution:

California – Inyo County: Independence IV. 12. 1919 (LACM) 1 specimen; VI. 5. /1906?/, A. Fenyes (CAS) 3 specimens; IV. 12. 1919 L. L. Muchmore (LACM) 1 specimen. Big Pine, VI. 5. /1906?/ A. Fenyes (CAS) 1 Spec.; Bishop, VI. A. Fenyes (CUNY) 4 specimens. Owens Valley (all without specific locations) VIII. 1935, from the E. S. Ross coll., specimen mistakenly labeled for Mono County (CAS); Owens Lake Valley, Mid. VII to mid VIII, 1978, 3 specimens, and III. 16.–IV. 17. 1978, 1 specimen, all by F. G. Andrews, A. R. Hardy, and D. Giuliani (CDFA).

Nevada – Churchill County: Fallon, 3900 ft., in nest of *Monica mutica*, VI. 3. 1965, R. C. Bechtel and P. C. Martinell (DAN) 5 specimens; 28 mi. W Fallon, IX. 7. 1951, I. La Rivers (DAN) 3 specimens. Washoe County: Pyramid Lake, VI. 23. 1978, J. N. Smith (in J. N. Smith collection) 1 specimen.

***Araeoschizus duplicatus* Casey, Figs. 16a and 20.**

Casey, Proc. Washington Acad. Sci., 9, 1907:490-491.

Frequently confused with *airmeti* Tanner. It may be easily differentiated by its more rounded prothorax (if viewed dorsally), by its broad shoulder and broad elytra with much smaller punctures than *airmeti*. This species has no spine on the posterior femorae. Medium brown; densely squamulose.

Head. — One-fifth longer, slightly narrower than prothorax; minutely punctured, between punctures very finely granulose, each puncture with short, club-shaped decumbent squamules. Frontal margin of head slightly convex, with shallow annules at middle, near margin with 3-4 longer, hair-like squamules curved toward center. Preocular angle short, partially hidden with upwardly protruding prominent, squamulose pre-ocular lobe, which has short, flat interior margin. Ocular groove deep, anterior portion short, not squamulose. Vertex moderately elevated, its posterior triangularly impressed, densely covered with squamules shorter than those of slightly concave frons. Ocular ridge prominent, distinctly carinate opposite anterior portion of ocular groove, sharply elevated about eye level, gradually sloping into occipital portion of head; ridge with dense row of erect, club-shaped squamules. Eyes relatively small, deeply set; 16-17 facets dorsally, 4-5 ventrally. Antennae robust, reaching slightly behind half of prothorax. Joints broad; 1 slightly longer than 2, 3 shorter than 2 but longer than 4-9; 10 about as long as 3, one-third broader; 11 about half size of 10. Surface, especially anterior edge of joints, densely covered with narrow, pale, longish squamules; squamulae thinner on 8, thinner yet on 9, 10, almost hair-like on 11.

Prothorax. — As long as broad at broadest anterior half; densely squamulose. Longitudinal groove shallow, especially anteriorly; at both sides of posterior end with two closely spaced distinct tufts of erect squamules. Margin squamulose; anterior with shorter, sides with longer erect squamules; posterior margin densely squamulose especially at posterior marginal angles. Margin broader at anterior half, slightly (occasionally not) constricted before posterior angle. Surface like that of head.

Elytra. — About one-fourth longer than head, prothorax combined; at middle twice as wide as prothorax at widest point. Shoulders broadly rounded, margins of scutellum hardly detectable. Primary cordae slightly more elevated than secondaries, both with row of posteriorly decumbent, curved, pointed squamules; those on secondaries less densely spaced, more decumbent, slightly shorter. Puncture lines prominent, punctures small, evenly spaced; distance between punctures equals diameter of punctures; however, at posterior fourth punctures gradually smaller towards end, distance between them longer. Primary corda 3 joins 4 near posterior end of elytra at level of end of corda 1; 2 shorter than 1. Secondary cordae not entire, all shorter than primary corda 1; 3 shortest.

Underside.

Head. — Very coarsely granulate. Surface, except broad-based, triangularly shaped gular area, sparsely, uniformly covered with short, chubby, forwardly decumbent, pale yellowish squamules, including large mentum; segments 1, 2 of maxillary plapus with much smaller, thinner squamules. Sublabial plate broad, margin straight, slightly carinate

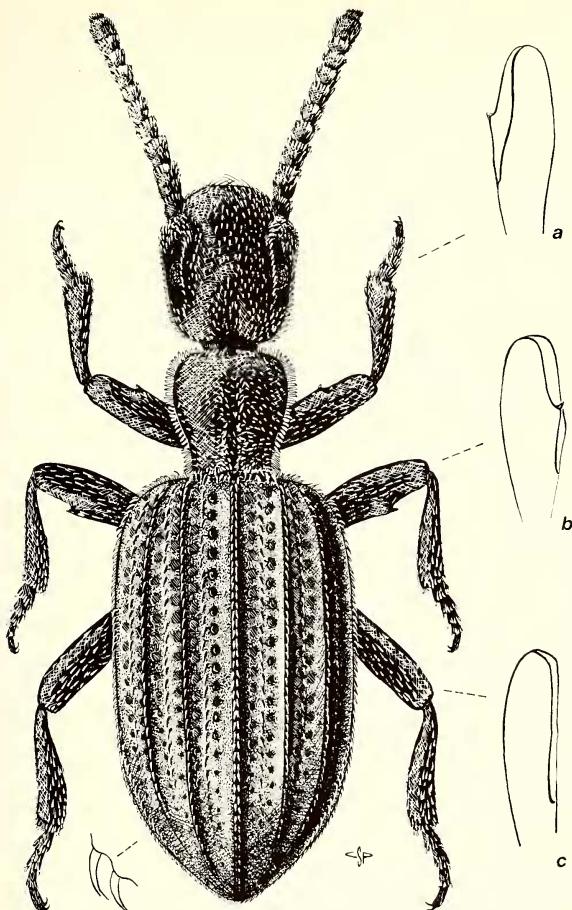


Fig. 21: *Araeoschizus laviversi* Papp, n. sp.

at inner base of short, yet prominent process of same. Basal groove of sublabial plate deep, broadly closely set to margin. Margin of pit of ventral portion of eye shallow, slightly, triangularly elevated anteriorly, facets deeply set.

Prothorax. – Sparsely covered with punctures; distance between punctures about size of diameter. Very sparsely squamulose at sides, more so at slightly elevated posterior ridge, on middle narrow prosternal process. Anterior carina blackish-brown.

Hind body. – Mentum minutely punctate, only edges of narrow mesosternal process covered with posteriorly decumbent squamules of same size as prosternal process. Metasternum with larger, flattish punctures, each with narrow, longer, tightly decumbent squamules. Inner portion of metacoxae with same size of squamules. Metasternal process short, anterior edge narrow, straight, blackish-brown. Abdominal segments

punctulate, size of punctures decreasing posteriorly, as thickness of squamules in punctures, while their density increases. Marginal row of squamules present on segments 2-4; 5 densely squamulose. Epipleuron smooth.

Legs. - Robust; anterior pair seemingly strongest, posterior longest. Spines not present on posterior femora. Uniformly squamulose; tibia more densely than femur; end of tibia with row of erect, sharply pointed, densely placed row of darder goldish-yellow squamules. All tarsal joints uniformly covered with short, thin squamules.

Length: 3.9-4.1 mm.

Distribution.

Holotype, Wyoming, Green River (USNM)

Additional specimens from:

Wyoming. - Fremont County: Riverton, in nest of the ant *Pogonomyrmex occidentalis* (2 specimens) and "2 Chamber L" (2 specimens), XI. 17. 1966, R. J. Lavigne (LAM); Riverton XI. 17. 1966, in the nest of the ant *Pogonomyrmex occidentalis*, R. J. Lavigne, 1 specimen (UCB), XII. 19. 1966, R. J. Lavigne, 1 specimen (UCB); XII. 19. 1966 in the nest of *Pogonomyrmex occidentalis*, R. J. Lavigne (UWY), 9 specimens. Dry Cheyenne Creek, E of Riverton, I. 17. 1967, in nest of *Pogonomyrmex occidentalis*, R. J. Lavigne (UWY) 56 specimens; II. 13-15. 1967 in nest of *Pogonomyrmex occidentalis*, R. J. Lavigne (UWY) 116 specimens. Sweetwater County: Green River (no data), Hubbard and Schwarz (USNM) 3 specimens; Wickham (USNM) 1 specimen (USNM); (no data) F. C. Bowditch (MCZ) 4 specimens; (no data) from the Liebeck collection (MCZ) 2 specimens; collected in 1889, from the Roland Howard collection (MCZ) 1 specimen.

Araeoschizus lariversi Papp, n. sp., Figs. 16a and 21.

Very much resembles *duplicatus* Casey. It is slightly larger, more squamulose, lighter brown in color; more slender. Posterior femur with straight edges along interior side near the deep groove (not so in *duplicatus*). Sometimes 2-3 short squamules seem to be forming a "spine", which has no chitinous base.

Head. - One-fourth narrower than long about eye-level. Posterior twothirds granulated; anterior smoother, finely punctured. Preocular angle not present, curved into contour of anterior margin of head. Preocular lobes distinct, flatly rounded, only very slightly elevated; interior margin deep anteriorly, gradually shallower behind more elevated short ocular ridge. Ocular groove deep, slightly granulose, not squamulose; anterior portion one-half as long as posterior, which reaches almost into an occipital curvature of head. Surface very densely covered with decumbent to recumbent, club-shaped, flattish, slightly curved squamules with broadly rounded tips. Squamules slightly larger, erect along sides posteriorly to eye; anteriorly more decumbent, very closely spaced on ocular lobes. Dorsal portion of eye with 20, ventral with 5 facets. Antennae robust, barely reaching middle of prothorax, in most specimens densely covered with broad, on anterior margin longer, other places with shorter squamules; in each case squamules longer

than those of vertex. Basal joint broadest, 3 shorter than 2, 4-9 about same length, however from 8-11 slightly flattened on sides; 10 about twice size of 9; 11 not quite half of 10, with broadly rounded plumose, pale tip. Individual joints well separated (except 10, 11), squamules on anterior margin of each in most cases not reaching basal half of next joint.

Prothorax. - As long as broad at broadest point, with very granulose surface. Longitudinal groove prominent, not reaching anterior margin. Sides broader in anterior half, then roundedly, abruptly constricted in posterior half, creating sharp, prominent, slightly exteriorly protruding posterior angle. Margins very densely squamulose, squamules erect, broad, pointedly club shaped at broader parts, narrower, shorter at anterior margin; dense arrangement of long squamules along posterior angle, margin, especially well separated tufts at end of longitudinal groove (deep, empty space between tufts a major character). Squamules on dorsal sides pointing towards ridges created by longitudinal groove; base of groove not squamulose.

Elytra. - Almost twice as long as broad at middle. Shoulders narrowly rounded, less than twice as broad as posterior width of prothorax. Sides at middle two-thirds parallel, very broadly, pointedly rounded posteriorly. Center of elytra slightly impressed (flat) which makes primary cordae 2 slightly more elevated than others, especially primary corda 1. All primary cordae originates at anterior end of elytra (incl. secondary cordae), fused into squamular line of long, erect row of squamules; on primaries 1, 2 squamular cover on ridge consists of 2-3 rows of squamules; secondary corda 2, etc., do not reach anterior margin of elytra. Posteriorly corda 1 slightly longer than 2, 3 joins apical margin near end of 2; marginal corda not entire, joins 3 near apical end. Secondary corda 1 longest (shorter than primary 1), 2-3 about same length (shorter than primary 2). Cordae with densely spaced row of pale yellow squamules; primaries with longer, curved, sharply pointed, overlapping squamules; secondaries with much shorter (not reaching base of next), decumbent, slightly curved squamules. Puncture lines prominent, edges sharp, in interspace 1 more closely spaced (distance between about diameter of puncture), in others gradually smaller, sparser.

Underside.

Head. - Coarsely punctured, almost granulose, very sparsely squamulose, except broader gular area and continuation of margin of submentum, which is nude. Mentum flat, anteriorly evenly rounded, surface with long, from center exteriorly protruding long, narrow squamules which are more densely spaced on sides; thinner, sparser on frontal margin. Submentum broad, margin slightly concave, internal base of process slightly carinate, angle straight, exterior margin broadly rounded; edges dark brown; surface densely squamulose; basal groove broad, long, deep, "bowl" shaped, not squamulose, except margin of submentum anterior to it.

Prothorax. - Surface densely punctate, between punctures minutely granulose. Only margin of prothorax, and broad prosternal ridge (which is not entire, abruptly ends before anterior margin), very broad prosternal process (the latter especially on edge) sparsely covered with posteriorly decumbent, club-shaped, pale yellow squamules. Coxae not squamulose. Subprosternal cavity with much shorter squamules.

Hind body. – Anterior half with large, shallow punctures; size, density of punctures gradually smaller towards posterior. Each puncture with squamula, which is longer, broader on meso-, metasternum, gradually narrower towards posterior; almost hair-like middle of abdominal segments, slightly broader at edge. Coxae with squamules in inner base. Mesosternal apophysis very narrow, tip convex, edges with short decumbent squamules. Metasternal process broader, edges black or blackish-brown. Area of intercoxal process deeply impressed, margins dark. Abdominal segment 4 narrow, nearly half size of 3; much narrower towards edge of elytra.

Legs. – Robust; anterior more so; posterior slender, longer; middle shortest. Spines only on anterior, middle femora; on posterior may 2–3 short, erect squamules but with no elevated chitinous base, since side of hind femora (edge of deep, long groove) is straight. Densely, evenly, somewhat orderly squamulose; anterior side of fore femora, posterior sides of others, with 2–3 rows of shorter, broader squamules than on sides. Squamular collar at tip of each tibia very prominent, consisting of row of densely placed squamules. All tarsal segments with thinner, shorter squamules, especially those of terminal joints.

Length: 4.0–4.3 mm.

Distribution.

Holotype: California, San Bernardino County, Needles, May 1950, collected by Ira LaRivers, in whose memory this new species is named. From the collection of NDA, transferred to CAS.

Paratypes: 18 paratypes from same location, same date; 4 in CDFA, 14 in NDA.

Key to the Species in Group II

1. All femora toothed. Prothorax longer than wide with protruding anterior angles, longitudinal groove deep, narrow. Body slender, sides not quite parallel. Length: 4.2–5.0 mm. (Extreme SE California) *hardyi* n. sp.
- Hind femora not toothed. Prothorax as wide as long, anterior angle not protruding; longitudinal groove shallow, wide. Body more robust, sides parallel in middle. Length: 4.0–4.1 mm. (Mexico, Baja California Norte) *percellosus* Papp

Araeoschizus hardyi Papp, new species, Figs. 16a and 22.

Resembles *percellosus* but easily differentiated by the presence of spines on all femora, the much broader occipital region of the head, the more slender, longer body, by the robust legs, slender antennae and the proportionally larger prothorax with its deep, narrower, longitudinal groove. Dark brown; shiny.

Head. – Large, about one-fourth longer than broad; one-fourth longer than prothorax. Very finely, minutely granulose. Preocular angle prominent. Sides parallel, then gradually curved toward flat frontal margin which has eight prominent corrugations,

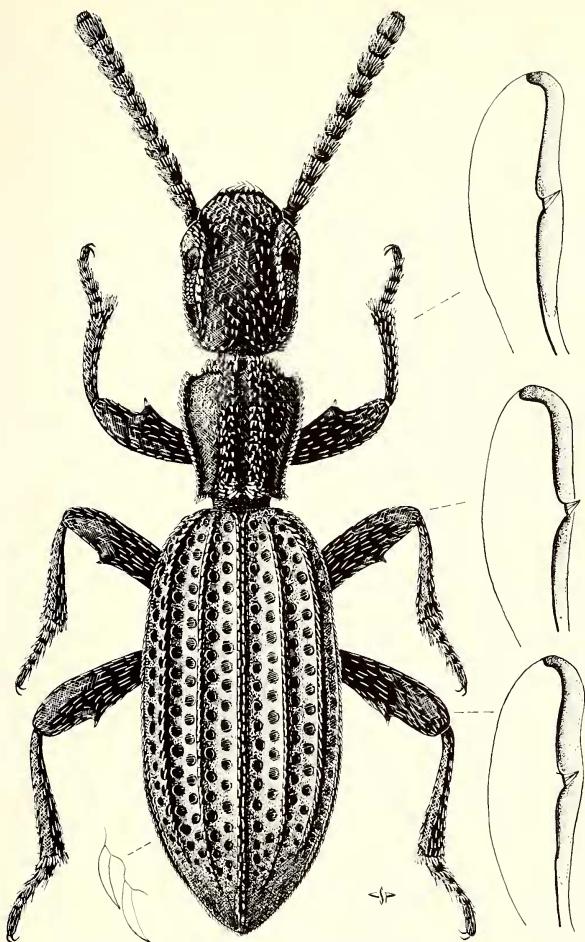


Fig. 22: *Araeoschizus hardyi* Papp, n. sp.

long, pale, inwardly curving hairs. Ocular lobe flatly triangularly rounded. Anterior portion of ocular ridge deeply set, higher opposite eye, bluntly ends at posterior of eye. Ocular groove short, anterior portion deeper. Surface uniformly covered with short, decumbent, at their base much narrower pale yellow squamules. Occipital region broad, with few semierect squamules in curvature. Triangular occipital impression shallow. Vertex moderately elevated, slight depression between eyes separates it from less concave frons if viewed from side. Eyes large, 15–16 facets dorsally, 5–6 ventrally. – Antennae slender, reaching to posterior third of prothorax; joints well separated, squamulose. Joint 2 longer than 1 or 3; 3 slightly shorter than 1; 4–8 about even size; 9 slightly broader than 8; 10 about twice size of 9; 11 smallest, its flat tip plumose. Evenly squamulose, squamules gradually thinner toward end; generally longer than those of head.

Prothorax. — One-fourth longer than broad; almost as long as head across ocular lobes. Two longitudinal ridges parallel, enclosed groove is evenly deep, bottom of groove flatly rounded. Anterior pronotal angle sharply pointed, sides evenly curved; constricted on posterior fourth, with strongly pronounced posterior pronotal angle. Posterior margin divided by two longitudinal ridges into three even parts; with heavy condesation of radially placed longer squamules at elevations; otherwise ridges evenly covered with anteriorly decumbent, pale squamules, slightly longer than those of head. Anterior margin varies. Typical form, represented by most specimens with broadly exposed anterior pronotal angle with forwardly protruding anterior margin, with deep indentation at middle, at anterior end of longitudinal groove. Occasionally indentation shallow, or hardly present.

Elytra. — Narrow, long; slightly more than twice as long as broad at widest point; three times as long as prothorax. Primary costae very prominent, sharply elevated, flatly corrugated; on each elevation with sharply pointed, in its middle thicker, posteriorly recumbent pale squamules almost touching each other at middle. Sutural line of squamules more decumbent, each squamula slightly shorter than those on primary costae. Interspaces with two rows of puncture lines; punctures relatively small, deep, edges sharp; frequently size of punctures differs within same row, almost every time within same interval. Bottom of first interval almost flat, others concave, evenly rounded. Sutural groove flat. Surface very finely, minutely granulose; shiny; blackish-brown; costae black. No secondary row of squamules. Costae well separated anteriorly; costa 3 joins margin near sutural line; costa 1 longer than 2; 3 longer than 2 but shorter than 1. Marginal folds with two rows of puncture lines; punctures small; distance between punctures as wide as three times diameter of punctures; elytral margin cordated, with row of posteriorly decumbent line of squamules from anterior margin of second abdominal segment.

Underside.

Head. — Dark Brown. Surface with very large, closely placed deep punctures, about half with longer, at their bases narrower, on their tip broadly flattened forwardly decumbent squamules. Gular line from base of head to basal groove of sublabial plate not squamulose, sharply constricted at middle. Mentum large, evenly rounded at front; middle of surface brown, slightly concave, with long, narrow, decumbent squamules radially projecting exteriorly; those toward frontal margin thinner. Galea lighter, maxillary palpi darker brown. Jaws relatively small, deeply set, shiny black. Postgenal process very prominent; squamulose; very broad at base. Basal groove of sublabial plate moderately deep, oppositely curved to frontal margin of sublabial plate; gradually shallower toward base of proboscis where it ends; surface roughly longitudinally wrinkled. Narrow space between frontal margin of sublabial plate, its basal groove squamulose. Ventral portion of antennal cavity small; posterior margin of pit finely granulose; not squamulose; black.

Prothorax. — Dark brown, edges black. Surface with irregularly placed large punctures not as dense as of head. Prosternal ridge prominent, anterior end not reaching margin of prothorax; surface with scarcely placed, posteriorly decumbent squamules; prosternal process evenly rounded, not steep, e. g., moderately dropping to posterior margin of prothorax, where squamules following curvature of more or less diamond-shaped pro-

cess. Episternum moderately convex; surface behind anterior angle, margin of prothorax deeply, triangularly convex, this convexity deeper anteriorly, especially near anterior end of prosternal ridge. Subprosternal cavity finely granulose. Procoxae with 1, 2 squamules, or occasionally none.

Hind body. — Dark brown; mesosternal process, intercoxal process, posterior margins of abdominal segments 1–4, black. Surface with large punctures, about size of those of prothorax, but more loosely spaced; punctures of abdominal segment 1 gradually smaller, shallower; hardly visible on 4, 5. Each puncture with yellow, posteriorly decumbent squamule, longer, broader on metasternum, anterior half of segment 1; gradually shorter, thinner toward end of abdomen; usually shorter on all sides. Mesosternum not squamulose, except narrow mesosternal process with long decumbent squamules on sides. Tip of rounded intercoxal process of abdomen impressed. Meso-, meta-coxae with 5–8 decumbent, flat squamules. Row of orderly placed squamules may be present on anterior margin of abdominal rings 3, 4; these slightly broader than those nearby. Middle surface of segment 5 with very short, thin squamules, slightly longer, broader toward edges; orderly, densely placed on posterior fourth. Middle of abdomen flat, center third of segment 3 impressed.

Legs — Robust; about same size; middle pair slightly shorter than 1, 3 longest. All femora with prominent spines of same size. Slightly darker brown than abdomen. Edges of longitudinal femoral grooves (in which the tibia rests when legs are contracted) with row of densely placed decumbent squamules; surface with thinner, shorter, more sparsely spaced squamules. Tibiae slightly more squamulose; squamules decumbent, slightly thicker, orderly, evenly spaced; on apical fourth of ventral side slightly suberect, longer, darker yellowish squamules; squamular collar at posterior end of tibiae dense, goldish-yellow. Tarsi moderately squamulose, squamules on ventral side slightly longer, darker.

Length: 4.2–5.0 mm.

Distribution.

Holotype: California, San Bernardino County, Cadiz Dunes, IX. 18. 1977. Collected in cereal bowl pit trap (cbpt) by Fred G. Andrews and Alan R. Hardy. In the collection of CAS.

Paratype: 21 specimens from same location with the following dates of collection: II. 24. 1978 (3); IV. 25. 1978 (2); VI. 16. 1978 (12); IX. 18. 1977 (4), all collected in cbpt by Fred G. Andrews and Alan R. Hardy (CDFA).

Additional specimens, all from California:

Riverside County — Rice Dunes: II. 25. 1978 (37); IV. 26. 1978 (2); IV. 17. 1976 (5); IX. 19. 1977 (7). Palen Dunes: IV. 27. — VI. 18. 1978 (3); IX. 20. 1977 (4), all collected in cbpt by Fred G. Andrew and Alan R. Hardy (in the collection of CDFA).

Imperial County — 3 mi. NW Glamis, III. 4. 1972 (2), F. G. Andrews; IV. 12. 1978 (3) in cbpt, M. Wasbauer; Algodones Dunes, 32° 25' 20" N – 114° 59' 14" W, Site 4 (7); Site 7, IV. 11. – 12., 1979 (3); 3.5 mi. SE Glamis, Algodones Dunes IV. 28. 1978 (5); Glamis IV. 23. 1972 (1); IV. 24. 1972, M. Wasbauer, all collected in cbpt (in the collection of

CDFA); 1 mi. N Glamis IV. 27.-28., 1972 (3) in cbpt, J. Doyen, D. Veirs (in UCB); 3 mi. N Glamis VII. 19. 1978 (4), in cbpt, F. G. Andrews and A. R. Hardy; 3 mi. N Glamis IX. 15. 1972 (1) M. Wasbauer; IX. 15.-16., 1972 (1) in cbpt, M. Wasbauer, A. R. Hardy (in CDFA); 2 mi. NW Glamis XI. 3. 1974 (9), in pitfall traps, J. Doyen and J. A. Powell (in UCB).

Araeoschizus percellosus Papp, Fig. 16b and 23.

A strikingly different species than one (*squamulissimus*) described in Group III from the same location. Easily differentiated by its slender body, minutely squamulose head, distinct puncture lines in elytral interspaces, and above all, minute spines on the anterior and median femora. The only species known from Mexico not having spines on all femora. Head and prothorax blackish-brown, rest chestnut brown; shiny.

Head. — About one-fourth longer than prothorax. Slightly narrower than long. Sides parallel, occipital margin broadly rounded; frontal margin flatly rounded, sharply, pointedly annulate in middle-third, with 3-4 long, inwardly curved pale hair-like bristles, lighter brown. Ocular lobe not very distinct, rounded on all angles. Ocular ridge well defined but not very prominent, its edge with row of very short, stubby squamules, shorter than those on ocular lobe. Ocular groove deep, curved, gradually diminishing towards posterior occipital angle; shiny, roundly granulose; bald. Eyes moderately small, with 17 facets dorsally, 5 ventrally. Occipital impression shallow, hardly visible. Vertex, frons, concave, with a shallow diagonal impression separating them between anterior end of ocular ridge. Surface finely rugosely punctate, moderately densely covered with recumbent short, stubby pale squamules posteriorly from level of ocular lobes; with slightly longer decumbent squamules on frons. Antennae short, thin; individual joints well rounded, 4-6 slightly smaller than others; 2 larger than 1; 3 about half of length of 2 but longer than 4; 7-9 gradually broader; 10 broader than 2, long as 3; 11 small, like 10 with thin golden-yellow squamulose hairs; hairs on 11 curving toward center of flat, pale colored plumes tip. Densely squamulose; squamules on anterior half of each joint generally twice size of those covering vertex.

Prothorax. — Shorter than head. About as long as wide at widest point. Surface irregularly covered with small, shallow punctures. Anterior margin slightly curved forwardly in middle; straight before sharp anterior pronotal angle; then broadly rounded on sides, gradually constricted before sharply pointed posterior pronotal angle. Posterior margin straight; very highly elevated at ends of two prominent median longitudinal ridges, then deeply impressed between. Longitudinal groove deep, broad, posteriorly broader than ne-third of length of posterior pronotal margin; sides parallel; ridges more elevated posteriorly; broader, flatter anteriorly, surface densely covered with erect squamules at posterior fourth, others decumbent, forwardly directed on ridges, inwardly on broad external sides of ridges. Otherwise more or less bald. Margins with row of dense, erect squamules about same size, shape as ridges; frontal margin entirely, posterior partially squamulose.

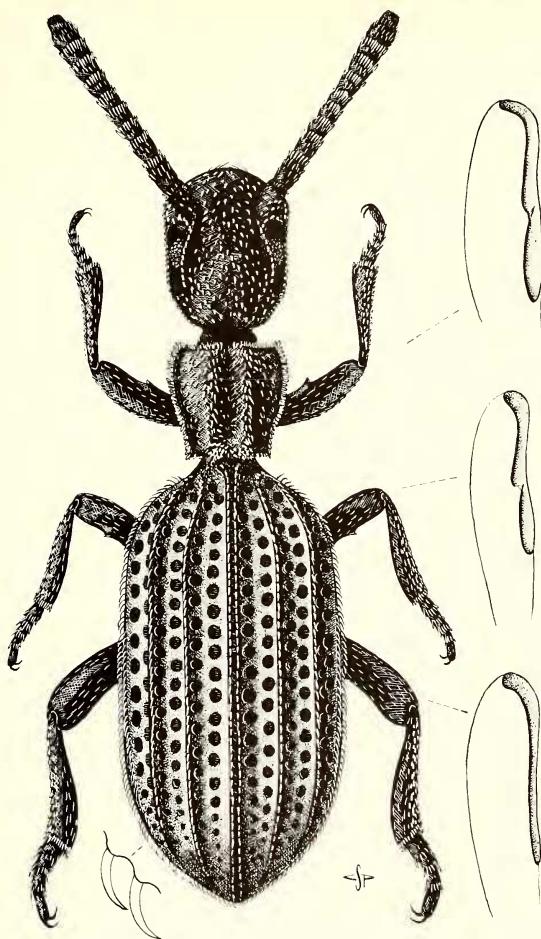


Fig. 23: *Araeoschizus percellosus* Papp.

Elytra. — Shiny. Shoulder broadly rounded, anterior end more narrowly. Costae very prominent, edges black, rest chestnut-brown. Interspaces convex, deep, each with two rows of deep puncture lines; distance between punctures slightly less than diameter. Sutural groove deep, with one row of minute punctures; sutural line with narrow, longer squamules than those on costae. Squamular lines dense, individual squamules well overlapping. Squamules on costa 4 slightly longer, more sharply pointed, sharply curved. Costa 1 longer than 4; 2 shorter than 4; 3 joining posterior margin behind end of 1. Posterior fifth of elytral margin cordated, with dense row of short squamules.

Underside.

Head. — Very coarsely, minutely punctured, with very few short squamules. Gular area very slightly impessed; gular line hardly present. Basal groove of sublabial plate extremely deep, with semicircular impression extending posteriorly to about middle of

length of head. Margin of submentum straight, finely squamulose; process short, sharply pointed, squamulose; black. Mentum semicircular in shape, slightly concave at middle, some short squamules toward edges. Maxillary palpi dark, terminal joint very broad, at least 3 times size of previous.

Prothorax. – Covered with large, deep punctures. Prosternal process very wide, squamulose; prosternal ridge very prominent, highly elevated anteriorly. Margin slightly curved posteriorly; squamulose. Posterior edge of prothoracic base with few (4–5) very minute squamules.

Hind body. – Mesosternum short; mesosternal process narrow, edge straight (almost triangular in shape) with single row of short squamules; with large punctures; bald. Episternum with deep punctures, each puncture with a broad, short, very decubent squamula (length of squamula about diameter of punctures). Abdomen also punctured, squamulose; intercoxal process evenly rounded, slightly impressed at middle. Punctures, squamules smaller on segments 2, 3; very minute on 4, 5 which are slightly impressed in middle of anterior margin.

Legs. – Median pair smallest, posterior largest. Anterior femur large; tibial groove broad, deep, gradually sloping posteriorly; interior margin with slight hump, with small spine created by sharply pointed squamula, supported by two smaller ones. Median femora slightly narrower, groove relatively deep, broad, external margin with spine like anterior. Hind femora with deep, broad groove, tapering posteriorly; no spine present. Tibiae slightly curved; exterior edge with large, blunt squamules; interior towards end with few longer, semierect hair-like squamules; sides sparsely covered with thin squamules; end broad, angularly ringed with circular row of short, broad, golden-yellow squamules. Tarsi short, edges with longer, pointed, erect squamules.

Length: 4.0–4.1 mm.

Distribution:

Holotype: Mexico, Baja California Norte, Diablo Canyon, July 19, 1979. Collected by Derham Giuliani. In the collection of the CAS.

Paratype: One specimen, with same data as holotype. In the CDFA collection.

Key to the Species in Group III

1. Head parallel-sided. Longitudinal groove of prothorax broad, even in width and depth 2
- Head not parallel-sided. Longitudinal groove of prothorax narrow, not even in width and depth 4
2. Head roundish, as long as wide. Prothorax narrower than head, constricted posteriorly; margins very densely squamulose 3
- Head square-elongate, uniform width. Longitudinal groove of prothorax constricted at middle; squamules short, sparsely spaced. – Length: 4.5 mm. (Mexico, Baja California Norte) *antennatus* Blaasd.

3. Each of the punctures on elytral puncture lines with a minute horizontal seta on the anterior wall of puncture; intervals shallow. – Length: 4.5–5.0 mm. (Mexico, Baja California Norte) *squamulissimus* n. sp.

– Punctures with no seta; intervals deep. – Length: 4.0–4.5 mm. (Mexico, Baja California Sur) *aalbui* n. sp.

4. Head constricted about eye level, not quite as broad across ocular lobe as long; margin sparsely squamulose 5

– Head not constricted about eye level; one-third longer than across ocular lobe; margins, especially occipital area densely squamulose 8

5. Prothorax as long as wide at widest point; longitudinal groove deep, parallel-sided in anterior half, constricted at middle of posterior half. – Length: 4.5–5.0 mm. (Mexico, Baja California Sur) *limbatus* Blaasd.

– Prothorax longer than wide at widest point; longitudinal groove gradually narrowing posteriorly 6

6. Head much broader anteriorly, angularly narrower posteriorly. – Length: 4.5 mm. (S. California, Joshua Tree Nat'l. Mon.) *hystrix* n. sp.

– Head slightly wider anteriorly, broadly rounded, sharply narrower posteriorly 7

7. Width of head across ocular lobe twice that of posterior margin of prothorax. Shoulder very narrow. Sides of elytra not quite parallel. – Length: 4.8–5.1 mm. (Mexico, W. Sonora Desert, N of El Golfo) *wasbauerorum* n. sp.

– Width of head across ocular lobe is one-third broader than posterior margin of prothorax. Shoulder narrow. Sides of elytra parallel. – Length: 4.2–5.6 mm. (Extreme SE California, Algodones Dunes) *andrewsi* n. sp.

8. Elytra evenly oblong, angle of shoulder about same as posterior angle of elytra; cordae highly elevated, with recumbent, sharply curved club-shaped squamules; secondary row of squamules deeply set, short, sparse, recumbent. – Length: 4.2–4.5 mm. (Mexico, Baja California Sur) *interjectus* n. sp.

– Elytra not evenly oblong; sides parallel 9

9. Occiput as broad as prothorax at broadest point. Longitudinal groove of prothorax broad, parallel, with rows of squamules 10

– Occiput narrower than prothorax at widest point. Longitudinal groove of prothorax broader anteriorly; squamules not arranged in rows. Anterior margin of prothorax densely squamulose, posterior more so. – Length: 4.4–4.7 mm. (SE Arizona) *lecontei* n. sp.

10. Margin of prothorax uniformly, somewhat loosely spaced long, erect, anteriorly longer, very pale-yellow squamules. – Length: 3.9–4.2 mm. (Mexico, Baja California Sur) *elegantulus* n. sp.

- Margin of prothorax uniformly, very densely covered with goldish-yellow squamules of even length. Head slightly narrower posteriorly. Longitudinal groove of prothorax slightly constricted behind middle. Sides of elytra not parallel; all primary cordae with long, erect, densely spaced row of squamules; secondaries with very sparsely spaced, short squamules. - Length: 4.0 mm. (Tucson, Arizona) *fimbriatus* Casey

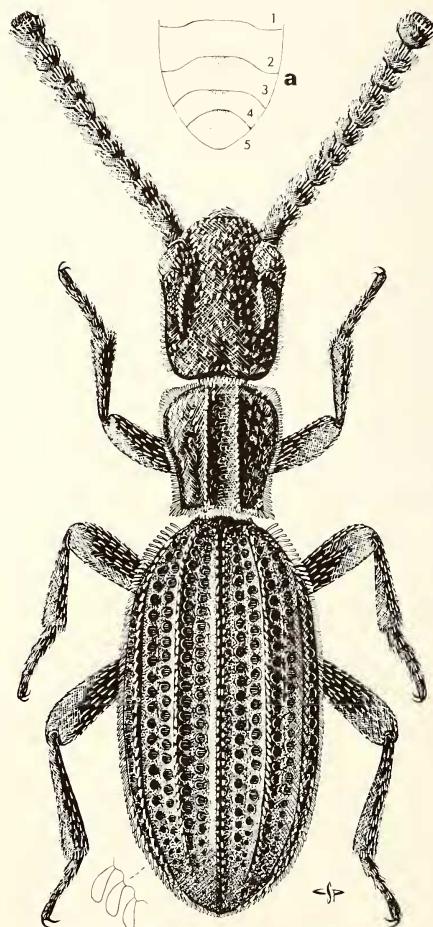


Fig. 24: *Araeoschizus aalbui* Papp, n. sp.

***Araeoschizus aalbui* Papp, new species, Figs. 16b and 24.**

At first sight resembling *limbatus* Blaiddell. It may be easily separated by the shape and sculpture of the head, the grooved prothorax, the more parallel-sided body and the arrangement of the squamules.

Head. — Large, one-fourth larger than prothorax, sides with broadly rounded corners, landing an almost squarish impression. Surface shiny, finely granulose anteriorly, roughly granulose posteriorly. Ocular ridge highly elevated, higher than ocular lobe, which is almost flat, broadly rounded, with distinct impression at its interior base. Vertex slightly elevated, frons less so. Surface sparsely covered with short club-like, disorderly light brownish-yellow squamules. Margin more densely, orderly squamulose, squamules somewhat longer at posterior third of head. Eyes large, 19 facets dorsally, 5 ventrally, placed in short, shallow ocular groove. Occipital impression deep, broad, at base as wide as groove of prothorax. — Antennae long as head, prothorax combined; flat; joint 2 about as long as 3, 4 together, as wide as 1; 4 slightly shorter than 3; 5-9 even in size; 10 broader; 11 narrower, not quite half as long as 10. Squamulose; narrow sides with long, thin golden-yellow squamules, broad surface bald, except near rounded anterior margin where sparsely squamulose, frequently leaving center of anterior margin bald; joint 8 and 9 with narrower, 10 with fine hair-thin squamules; 11 very finely plumose.

Prothorax. — Three-fourth length of head, one-sixth narrower than long. Dark brown, margins almost black. Surface rugulose. Longitudinal groove in middle very prominent, almost parallel sided, slightly narrowly rounded near posterior end; ridges with single row of erect, short squamules. Anterior pronotal angle broadly rounded; sides constricted behind middle, slightly widened near posterior angle. Margin densely covered with long squamules, which are longer around anterior angle, and at posterior; anterior margin with more closely placed, shorter squamules. Remainder of surface sparsely covered with short, semierect squamules, smaller than those of vertex.

Elytra. — One-fourth longer than head, prothorax combined, not twice as long as broad at middle. Anterior, posterior margin similarly, broadly rounded, in center third sides parallel. Primary cordae 1-3 very prominent, 4 shallower; sutural lines of squamules joins outwardly with costa 1-2-3. Sutural squamules short, sparsely spaced, posteriorly recumbent; on costa 1, 2, 3 squamules much longer, very dense, erect, similarly shaped (see illustration); costa 4 with short, sparsely spaced squamules about humeral area, more dense, longer toward posterior. Marginal fold very narrow, with two rows of shallower punctures; all other elytral interspaces with two rows of densely spaced, large, deep punctures, between puncture lines with a very shallow secondary costa covered sparsely with row of short, decumbent pale-yellow squamules. Primary costa 1 almost touching the posterior margin of tip, 2, 4 about even in length; 3 joins with short cordated elytral margin near tip of elytra. Secondary row 1-2-3 of squamules are of same density as those on sutural line; 1 longest, 3 shortest posteriorly; 4 shorter than 3 on both ends; that of marginal fold shortest. Squamules on frontal fourth of elytra longer, erect, slightly shorter, more decumbent toward posterior.

Underside.

Head. — Head very finely granulated, surface with decumbent, narrow, pale squamules orderly placed directed toward large, sharply pointed post genal process, leaving broad gular line up to basal groove of submentum open; squamules slightly thicker posteriorly, more dense at base of head. Frontal margin of sublabial plate straight. Mentum broader than long, with short, club-shaped, decumbent squamules along side edges pro-

jecting outward. Apical joint of maxillary plapus broader at basal third, narrower toward blunt end. Ventral ocular groove much shallower than antennal basal cavity, its margin sharply elevated, triangularly pointed at middle.

Prothorax. — Surface with irregularly placed large, deep punctures; sparsely covered with short decumbent squamules on prosternal ridge, which is broadly — triangularly widened at anterior carina, continuing and gradually flattening into broad, marginally strongly squamulose, from middle very sharply inward-curving prosternal process. Margin of prothorax distinct, broadly annulate toward posterior, with rounded posterior angle, continuing in carina of prothoracic base, which is covered with a row of erect squamules of smaller size toward prosternal process. Dark brown, margins black.

Hind body. — Irregularly punctured, each puncture with long, posteriorly decumbent squamula originating at anterior base inside puncture. Punctures gradually fading toward posterior. Squamules even in size on metasternum; thinner, longer in middle of abdomen, slightly shorter, thicker on sides; extremely short on 5th. No marginal rows of squamules.

Legs. — Posterior pair largest. The femora with short, decumbent, thin squamules on broad sides; with slightly thicker squamules on the narrow sides. Longitudinal groove on ventral side of femora deep, broader on anterior pair, deepest on posterior, edges with row of orderly placed pale squamules. Tibiae shorter than femora; frontal, middle straight; hind slightly curved near posterior third (viewed laterally); sides sparsely covered with short, decumbent, edges with two rows of somewhat heavier recumbent squamules; terminal end with ring of spine-like squamules, larger externally. Tarsi with hair-like squamules, terminal joint (without sharply pointed claws) are as long or longer than previous two joints together.

Length: 4.0—4.5 mm.

Distribution:

Holotype: Mexico, Baja California Sur, 5.7 miles SE of Mulege. July 7, 1979. Collected by Dr. Fred G. Andrews, Dr. Alan R. Hardy and Mr. Derham Giuliani. In the collection of CAS.

Paratypes: 26 paratypes with same data as holotype. In the CDFA collection.

***Araeoschizus andrewsi* Papp, new species, Figs. 9, 11, 13, 16a and 25.**

By its longer than average size, blackish-brown to dark-brown color, flatly rounded occipital region, narrow shoulders, slender form, it may easily be separated from any other species.

Head. — Large, slightly less than one-fourth longer than broad, as broad as prothorax at widest point. Preocular angle entire (e. g. sides of frons parallel), frontal margin of head flatly rounded, in center half with 5—6 well distinguishable prominent annules. This area lighter in color. Ocular lobe very prominent, triangularly, sharply pointed. Anterior portion of ocular ridge highly elevated, sharply bent in posterior half, then gradually sloping, creating posterior portion of ocular ridge near occiput, enclosing long, narrow

posterior portion of ocular groove. Anterior portion of ocular groove about one-third length of posterior; broader, deeper, very finely punctate. Surface of head shiny, extremely finely punctate, densely covered with forwardly decumbent pale-yellowish squamules. Squamules longer in occipital region, and leaving occipital impression open. Interior margin of proocular lobe deep, free of squamules. Frontal margin of head with three longer hairs on each side curving toward center. Marginal squamules from anterior portion of ocular groove posterior to occipital region very dense, decumbent forward, touching. Vertex more convex than frons, with shallow impression between. Eyes moderately large, with 20 facets dorsally, 5 ventrally. — Antennae as long as distance from basal joint to posterior third of prothorax; joint 1 as long as 2, 3 shorter than 2, longer than 4, which is longer than 5 or 6, latter longer than 7, 8, or 9; 10 about size of 3 but slightly broader with parallel sides, pointedly rounded corners; 11 small, about one-third of length of 10. Joints well separated, covered with narrow squamules, which are shorter on joint 1, slightly longer on 2-9, while gradually narrowing in width, becoming almost hair-like on 10, 11 joints; shorter, much thinner on 11. Anterior portion of each joint covered with dense ring of pale yellowish squamules of even size, not covering base of preceding joint from view.

Prothorax. — About one-sixth longer than broad, broadest in anterior third. Frontal margin one-fifth broader than posterior. Anterior pronotal angle slightly rounded, posterior sharply pointed. Center portion of anterior margin indented near apical angle. Longitudinal groove entire, however, shallower posteriorly, as two longitudinal ridges. Convex in anterior half, with flatter, blackish margin. Posterior margin not straight, impressed at middle, on first, second third of length sharply elevated, creating posterior end of two longitudinal ridges. All margins densely squamulose; front, sides with longer erect, broader squamules, posterior margin with shorter. Surface covered with squamules; squamules more dense toward posterior end of groove.

Elytra. — Nearly one-third longer than head, prothorax combined; about 2.5 times longer than head. Primary costae very prominent; black; sharply elevated; edges corrugated, each elevation with backwardly decumbent, sharply pointed pale squamules overlapping each other. Squamules on costa 4 slightly less densely placed, more pointed, almost touching; toward end squamules broader, very densely placed. Interspaces with two rows of deep, sharp-edged punctures, distance between punctures less than half diameter of larger punctures in middle of elytra. Between puncture lines seemingly very shallow secondary costa with even (not corrugated) ridge, which is covered with row of decumbent squamules about same size, but without sharply pointed ends as those on primary ridges; more dense on 1, somewhat sparser on 2 to 4 interspaces. Sutural costa broad, as wide as diameter of punctures, elevated, middle flat, coarsely granulated, margin (sutural costae) densely lined with decumbent, shorter squamules; parallel; anterior end in scutellar area slightly broader, posteriorly slightly so before fused end. Primary costa 3 joins margin of elytra at posterior base of scutellar groove; corda 1 posteriorly slightly longer as 3; 2 shorter than 3, anteriorly even in length. Secondary row of squamules anteriorly originates at same level (much shorter than primaries), 3 shorter, 4 shorter than 3; posteriorly 1st longest but shorter than first primary, 2, 3 about even, 4 shorter. Ratio varies by

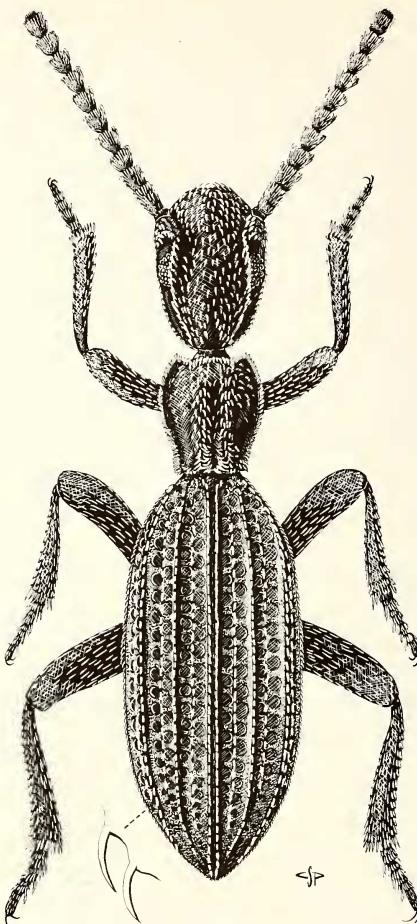


Fig. 25: *Araeoschizus andrewsi* Papp, n. sp.

specimen; as a rule 4th is always shortest. Squamulous edge of elytral margin cordated for entire length, with squamules as illustrated. Marginal fold of elytra (pseudopleuron) smooth, two longitudinal puncture lines consisting of smaller punctures, distance between punctures about size of diameter of punctures. Margin of elytra (epipleuron) black; most prominent below shoulders.

Underside.

Head. — Finely granulated, moderately densely covered with forwardly decumbent squamules, leaving longitudinal area from gular region to basal groove of submentum clear, this area broader posteriorly. Mentum evenly rounded on front with almost parallel sides, at middle with few decumbent narrow squamules, toward sides with somewhat longer, decumbent squamules pointing outward; at front margin, area near mar-

gin, with dense, erect, sharply pointed, narrow, hair-like squamules. Joint 2 of maxillary palpus shorter than 1, 3, latter slightly broader, darker, flat tip with fine plumose margin. Galea very pale yellow, terminal joint longest, bluntly pointed. Mandible two-forked extremely smooth, shiny, black, Post genal process very prominent, sharply pointed, inner sides parallel, surface with short decumbent squamules in position following shape of proboscis. Antennal basal cavity deep, ridge separating it from ventral ocular groove very prominent. Ventral ocular groove narrow, nearly parallel sided anteriorly, broader towards ventral portion of eye, margin of head.

Prothorax. – With large circular punctures, narrow area between punctures very minutely granulose. Prosternal ridge ends close to ventral anterior margin of prothorax, more sharply elevated near blunt ending; its surface with backward leaning decumbent hairs originating at anterior margin of each deep puncture, becoming more numerous posteriorly, then disorderly covering surface of large, broad prosternal process where becoming more recumbent, longer, more orderly placed along margins. On ventral side with few fine, longish, hair-like squamules near opening of coxal cavity.

Hind body. – Except abdominal segments 4, 5, with large, deep, more roundish, very closely placed punctures, each with one decumbent squamula protruding inside anterior margin, pointing posteriorly; squamules thin, gradually narrower towards ends, longer than diameter of punctures. Segments 4, 5 (anal sternite) minutely finely granulose, on anterior portion of 4 may be a few faint circular impressions; decumbent squamules on 4 shorter, broader on posterior margin, parallelly orderly placed; 5 with evenly thin decumbent squamules with some shorter toward apical, longer on base of anterior margin. Mesosternal epophysis half as wide as prosternal process of prothorax, punctured, with dense, longer squamules. Mesosternum similarly punctured, with narrow long squamules. Intercoxal process of abdomen well visible, deeply impressed anteriorly. Squamules on ventral surface of meta-, meso coxae longer, broader than on procoxa.

Legs. – Long, slender, squamulose; fore, middle legs shorter, usually same size. Longitudinal groove on ventral side of femora deep, well visible, shorter on hind femur. Tibia shorter on front leg, longer on hind; ends with ring of dense, short, thicker, erect, sharply pointed squamules. Tarsi similarly squamulose, except on ventral side, squamules longer. Arrangement of squamules on legs as follows: dorsal surface of femora with thin, decumbent, sparsely spaced squamules; same on the ventral side of tibiae, where 4–5 longer, semierect squamules added toward posterior end; shorter, thicker squamules on ventral side of femora orderly placed along edges of longitudinal cavity, shorter, more densely placed on ventral side of tibiae.

Length: 4.2–5.6 mm.

Distribution:

Holotype: California, Imperial County, Algodones Dunes, 7 miles SE Glamis, 32°, 55', 20"; 140°, 59', 14" N, Site 4. March 25, 1979 – April 8, 1979. Collected in cereal bowl pit trap by Dr. Fred G. Andrews and Dr. Alan R. Hardy. In the collection of CAS.

Paratypes: 20 paratypes of the same location in the collection of CDFA.

More than 1000 specimens examined, all in the collection of CDFA.

Data on locality labels: Algondones Dunes, 7 mi. SE Glamis, $32^{\circ} 55' 20''$ N – $114^{\circ} 59' 14''$ W. III. 25. 79 – IV. 8. 79; III. 19. 79 – III. 24. 79; IV. 9. 79 – IV. 24. 79; IV. 12. 79; IV. 17. 79, all in cereal bowl pit traps. Additional specimens: Algondones Dunes, 2.5 mi. NE Coachella Bridge 1, date: IV. 17. 79. All collected by Drs. Fred. G. Andrews and Alan R. Hardy.

***Araeoschizus antennatus* Blaisdell, Figs. 16b and 26.**

Blaisdell, Proc. Calif. Acad. Sci., 24 (7), 1943:215–216, Plate 11, figs. 1 and 4.

Superficially resembling *limbatus* Blaisdell; easily differentiated by the long head, more slender prothorax, the very narrow, rounded shoulders, narrow, elongated body. Dark brown; shiny.

Head. – One-fourth longer than broad behind well elevated ocular lobe. Preocular angle evenly, continuously rounded with prominent frontal margin, with two small, well-defined annules each side of middle; 2–4 short, sharply inwardly curving bristles. Ante-

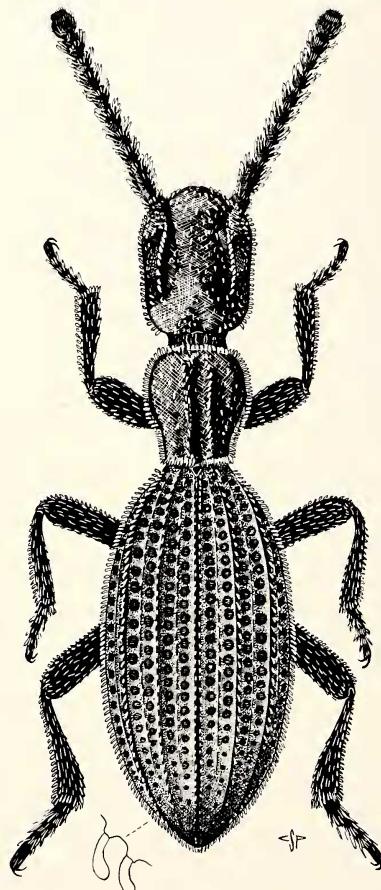


Fig. 26: *Araeoschizus antennatus* Blaisdell

rior exterior angle of ocular lobe rounded, seemingly continuation of frontal margin; rounded, angularly elevated. Sides slightly constricted at eye level; occipital region broadly angularly rounded. Ocular ridge prominent, highly elevated, gradually shallower behind eyes. Ocular groove shallow: portion anterior to eye shorter. Surface very finely, unevenly granulate-punctate; each impression with a forwardly, slightly recumbent, short, pale-yellow, club shaped squamule, squamules slightly longer, almost decumbent on frons. Posterior margin almost straight, with deep, broad triangular impression on posterior half of well elevated vertex. Margin with erect squamules, which are denser on ocular lobe, more so on ocular ridge. Eyes small, elongate, strongly concave; with 19 facets dorsally, 5 ventrally. — Antennae reaching into posterior fourth of prothorax. Joints well separated; 2 longest, broadest, narrower at base; 1 nearly as broad as 2, shorter; 3 broadly rounded at anterior, narrow at posterior end, one-third shorter than 2; 4-9 about even (however 4-5 slightly broader); 10 slightly impressed laterally, about as wide as 3; 11 short, about half size of 10. Joints 1-6 with longer erect squamules, from 7 on squamules slightly narrower, shorter; on 10 hairlike, on 11 more so. Squamules on joints 3-8 on anterior half of each joint; on 9-10 surface uniformly squamulose.

Prothorax. — Almost as long as wide on broadest anterior half. Somewhat darker brown than head, elytra; very coarsely granulose. Frontal, posterior margins straight; latter more densely squamulose. Sides broadly rounded behind slightly rounded anterior angle, then gradually constricted towards middle; posterior third nearly parallel, with erect, sparsely spaced pale squamules. Longitudinal groove narrower at middle; deepest at posterior fourth; not squamulose. Two longitudinal ridges well elevated, with row of dense, erect, darker yellow squamules; slightly constricted about middle. Surface between ridges, exterior margins of prothorax very densely covered with short, erect squamules. Dense, golden-yellow multiple row of squamules on posterior margin, separated in middle, leaning toward ends of two ridges, not forming tufts.

Elytra. — About one-fourth longer than head, prothorax combined; slender. Anterior margin straight, short, same width as posterior margin of prothorax. Scutellum sharply pointed, well defined. Shoulder narrowly rounded, almost same angle as posterior of abdomen; sides at middle-third almost parallel. Primary cordae prominent, sharply elevated with erect, slightly curved club-shaped squamules, somewhat recumbent in posterior fourth. Secondary corda 1 slightly elevated, others not; squamules on secondary row, sutural lines sparse; distance between squamules much less than length of squamules; not entire, 1 longest, 4 shortest. Puncture lines prominent, punctures round, deep, with sharp edges; distance between less than half diameter of puncture; surface between very finely granulose.

Underside.

Head. — Surface very coarsely granulose; hour-glass shaped gular groove deep, broad, its margins distinctly squamulose; surface finely punctulate; basal groove of post gena deep, broad. Mentum slightly broader than long, lighter brown; densely covered with outwardly projecting, hair-like squamules; sides, front continuously evenly rounded. Terminal joint of maxilla shorter, narrower than proceeding; pale yellowish-brown. Post genal process sharp, prominent, interior base slightly carinate, margin between

straight; surface of process, margin of plate evenly densely squamulose; genal area sparsely covered with club-shaped, forwardly recumbent pale squamules, which are slightly longer both sides of posterior end of gular impression.

Prothorax. — Surface granulose; only area anterior to coxae, prominent prosternal ridge, margin of prosternal process sparsely squamulose. Prosternal ridge slightly elevated, "Y"-shaped at anterior end; posterior end sharply constricted, more elevated between coxae; prosternal process broadly rounded, narrowly-pointedly reaching posterior margin of prothorax.

Hind body. — Surface with large, flat, densely spaced punctures; each puncture with a narrow, decumbent squamules which is slightly longer than diameter of puncture. Size of punctures for abdominal segment 2 gradually decreases posteriorly; those on segment 5 about one-third of those on 1. Mesosternum short, mesosternal process narrow, slightly broader, flatly rounded posteriorly. Metasternum with narrowly rounded metasternal process, which is slightly more elevated than posterior margin on opposite side. Segment 1 with broad, sharply forwardly pointing, triangularly shaped process between posterior coxae, which is blackish-brown, impressed in middle. Segments as above.

Legs. — Femora of uniform thickness; posterior pair longest; middle pair slightly smaller than anterior. Sides sparsely, edges densely covered with short, recumbent, club-shaped pale squamules. Tibiae more squamulose than femora, with distinct tibial collar consisting of row of short, erect, golden-yellow spine-like squamules. Tarsi densely squamulose throughout.

Length: 4.0–4.2 mm.

Distribution:

Holotype: Mexico, 10 miles S of Punta Prieta, Baja California Norte, June 21, 1938, Michelbacher and Ross Collectors (CAS).

Additional specimens: Mexico, 13 mi. E of El Rosario, Baja California Norte, D. Q. Cavagnaro, G. E. & E. S. Ross, and V. L. Vesterby Collectors, 2 specimens (CAS). Santa Ynez, Baja California Norte, April 11, 1978, H. Clark Collector, 1 specimen (CID).

Specimens from El Rosario and Santa Ynez (some 60 mi. apart; 120 mi. North of type locality) slightly differ from the holotype. However, insufficient material makes it unjustified to handle those as a subspecies to *antennatus*. The differences may be summarized as follows:

Slightly more slender. Head narrower posteriorly. Occipital impression broad, flat. Ocular groove posterior to eye flat, not outlined. Ocular ridge shallow; with erect longer squamules. Eye large, 18 facets dorsally, 5 ventrally. Antennae very densely covered with semierect long squamules. Surface of head densely punctured with smaller punctures than prothorax. Prothorax similar to *antennatus*, except squamules on longitudinal median ridges (creating groove), and along margins of prothorax, goldish-yellow, long, erect. Elytral costae with denser row of longer erect squamules. Sutural line very narrow, not grooved, tightly fused, two rows of erect squamules sparsely spaced, short, same size shape as on secondary rows.

Araeoschizus elegantulus Papp, new species, Figs. 16b and 27.

Resembles *aalbui* in many respects. Easily differentiated by the shape of the head, the proportions of prothorax, the more dense and longer squamules on marginal areas, including the legs. Head and prothorax darker, rest lighter brown; shiny.

Head. — One-fourth longer than broad at ocular lobes, where broader than prothorax at widest point. Coarsely punctate, granulose between punctures. Vertex covered with erect, recumbent on frons, at their tips slightly curved squamules. Ocular lobe prominent; ocular groove shallow, short, granulose. Ocular ridge highest near eye, with row of dense, erect squamules. Eye large, 18 facets dorsally, 5 ventrally; facets large. Occipital portion of head flatly impressed; vertex moderately convex, gradually sloping anteriorly into almost flat frons, which is more densely squamulose than rest of head. — Antennae robust, about as long as head, prothorax combined. Flattened; joint 2 longer than 1; 3–5 as long as 1 and 2 together; 5–9 same size; 10 much flatter, broad; 11 nearly half 10. Very squamulose especially on narrow sides; 10, 11 with fine, hair-like squamules.

Prothorax. — Small, in relation to entire body, with very prominent, broad median groove. More than one-fourth shorter than head; about as long as wide on widest anterior fourth; anterior pronotal angle broadly rounded, sides behind middle constricted, nearly parallel in posterior fourth. Posterior pronotal angle vertical. Median groove parallel-sided, one-third as wide as posterior margin. Finely granulose, surface very sparsely covered with short, recumbent squamules, including longitudinal groove. Margins very densely covered with row of longer, broader squamules than on side of head; two median ridges each with row of erect squamules of same size as on anterior, posterior margins of prothorax. Posterior margin more densely squamulose.

Elytra. — Lighter brown. About one-third longer than head, prothorax combined. Shoulders, posterior end, rounded about similar angles, sides in median half parallel. Primary costae very prominent, densely covered with erect, club-shaped squamules, those anteriorly longer and narrower; squamular lines not joining along anterior margin of elytra. Sutural groove shallow, narrow, slightly darker. Interspaces with two rows of deeply impressed puncture lines, punctures occasionally opposite each other. Secondary costae not present. Secondary row of squamules very short, recumbent posteriorly, sparser than those of same size on sutural costae. Primary costa 1 longer than 2, not reaching posterior apical margin; 4 shorter than 2 at both ends; 3 entire, joining margin near tip of elytra. Secondary rows of squamules of various lengths; anterior ends about even, in level behind shoulder at point where sides became parallel; 1 longer than 2, 3 very short with squamules spaced in uneven distances; 4 hardly present. Margin of elytra cordated in posterior half; two rows of punctures between margin, primary 4 corda; interspaces with short line of secondary row of squamules about at middle. Generally: squamules anteriorly much longer than on posterior portion of elytra.

Underside.

Head. — Shiny, evenly convex, gular area slightly flattened. Finely, evenly punctate. Scarcely covered with erect (posteriorly), suberect to recumbent (anterior two-thirds), towards their tips broader, pale yellow, short squamules, leaving gular area and narrow



Fig. 27: *Araeoschizus elegantulus* Papp, n. sp.

gular line uncovered. Submentum prominent; process long, sharply pointed, with dense coverage of short squamules; its interior basal curvature convex, margin slightly so in middle. Mentum flat, semicircular, with edges densely covered with short, thick, surface with much thinner, squamules. Terminal joint of maxillary palpus large, broadest at middle, evenly rounded at tip; darker than others, basal joint with a row of 4-5 narrow squamules on anterioventral edge. Antennal basal cavity shallow; posterior part below dorsal ocular lobe partially covered with decumbent squamules of same size as on margin of head near eye. Ventral ocular groove flat, hardly present, small, covered with five large facets of ventral portion of divided eye; margin of pit present, slightly elevated, black.

Prothorax. — Narrow, very convex toward anterior end of widened prosternal ridge, which is sparsely covered with short, decumbent squamules. Anterior part of prosternal process broad, sides almost parallel, posterior part about twice as broad, almost

round between procoxae; edges covered with longer, heavier, decumbent squamules; tip of process short, sharply bent. Hypomeron convex, deeply impressed near coxae opposite posterior angle. Margin slightly undulate, posterior angle sharply, evenly rounded; with erect, densely placed squamules, longer anteriorly, shortest along base of foraminal carina. Edges dark-brown to black.

Hind body. — Shiny, brown; surface with large, closely spaced, about even sized punctures, each with one long, posteriorly decumbent squamula; interspaces between punctures very minutely verrucose. Squamules slightly thicker on metasternum. Metasternal apophysis narrow, its posterior apical margin slightly convex; margin between metacoxae with row of 5–6 squamules of same size as on metasternum. Intercoxal process of abdomen 2.5-times wider than mesosternal apophysis; triangular. Marginal row of squamules very distinct. Squamules on segments 4, 5 slightly thinner, shorter than others.

Legs. — About even size, middle pair slightly smaller. Groove on ventral sides of femora shallow, short; longest on 1, shortest on 3; edges with short decumbent squamules of same size as on the opposite part of femora; dorsal, ventral sides with much thinner squamules. Tibiae very slightly curved outward near their ends; sparsely covered with longer squamules, exterior edges with row of squamules leaving basal half of tibia at its edge uncovered; on interior side squamules flat, decumbant in basal two-third, semi-erect, more pointed towards end. End of tibia broad, angularly marginated with longer, erect row of golden-yellow squamules. Tarsi short, heavily covered with long, sharply pointed spine-like squamules of same color; last tarsal segment as long or longer than 1, 2 combined, also densely squamulose.

Length: 3.9–4.2 mm.

Distribution:

Holotype: Mexico, Baja California Sur, 2 miles E of San Ignacio, July 6, 1979. Collected by Dr. Fred G. Andrews, Dr. Alan R. Hardy, and Mr. Derham Giuliani. In the collection of CAS.

Paratypes: 3 paratypes with same data as holotype. In the CDFA collection.

***Araeoschizus fimbriatus* Casey, Figs. 16a and 28.**

Casey, Ann. New York Acad. Sci., 5, 1890:369; Proc. Washington Acad. Sci., 9, 1907:487.

In some respects resembles *elegantulus* Papp. Posterior portion of ocular lobe is very long, almost reaching to the center of the compressed occipital region; posterior portion of ocular ridge long, continuing in erect squamules to the center of the vertex. Edges of the prothorax and all cordae of the elytra are densely squamulose. Light brown, prothorax slightly darker.

Head. — About one-third longer than broad at broadest point. Uniformly densely punctured, each puncture with erect, curved towards tip, club-shaped pale yellow squamule. Preocular angle short, frontal margin of head flat, densely squamulose. Ocular lobe



Fig. 28: *Araeoschizus fimbriatus* Casey

evenly rounded; interior margin deep, blackish, not squamulose. Ocular ridge prominent; highest at eye level, sharply curved exteriorly, then inwardly behind eye, gradually fusing with concave vertex; edge blackish-brown, densely squamulose; squamular line continuing into vertex, which is densely covered with erect squamules longer than those on frons. Margin of occiput densely squamulose; inner surface bald; occipital impression broad, deep, triangularly, extending towards middle of vertex. Eyes composed of large facets, 17 dorsally, 6 ventrally. — Antennae long, reaching nearly to posterior margin of prothorax. Joints relatively closely fit; 1 longest; 3 two-thirds of 2; 3 slightly longer than 4; 4-6 even sized; 7-9 slightly compressed laterally; 10 size of 3; 11 short, flat. Densely squamulose throughout; 10-11 with hair-thin squamules; 11 with plumose tip.

Prothorax. — About as long as broad, broadest in anterior half. Middle of frontal margin straight, anterior pronotal angle sharply rounded, gradually broadly rounded

about anterior half; constricted in posterior. Surface densely granulate-punctate; margins of deep longitudinal groove well elevated, edge squamulose; margins slightly constricted behind middle; between edges bare. Margins densely covered with darker-yellow squamules about twice as long as those on vertex; sides with few, disorderly placed very short squamules. Squamular collar on posterior margin dense; as at anterior margin, deviated in middle. Slightly darker brown, almost black at edges.

Elytra. — One-third longer than head, prothorax combined. Humeral area narrowly rounded, sides nearly parallel at middle. Primary cordae prominent, densely covered with erect (in anterior half), slightly decumbent (posterior half), club shaped pale-yellow squamules; corda 1 ends near tip of elytra; 3 joins marginal corda near tip of elytra; 2, 4 of even length; all cordae entire anteriorly. Secondary cordae absent; indicated by row of sparsely spaced smaller squamules of various lengths. Sutural groove extremely narrow, sutural costae presented only by rows of semi-erect squamules, much shorter than those in secondaries; more densely spaced, almost touching. Puncture lines in inter-spaces prominent, punctures large, closely spaced throughout.

Underside.

Head. — Surface densely, closely punctured, some punctures on sides with forwardly decumbent short squamules, with shorter squamules toward middle; gular line not squamulose, reaching deep basal groove of submentum. Mentum about as long as wide; evenly rounded anteriorly; surface less prominently punctured; with few shorter squamules on black frontal margin. Post genal process sharply pointed, densely closely squamulose; base at interior deeply carinate. Submentum sharply elevated, center base deeply impressed; frontal margin almost straight; black; edges squamulose.

Prothorax. — Coarsely densely punctured, punctures slightly larger than on head. Brown; margins black, especially anteriorly. Prosternal ridge prominent, sharply triangularly elevated; bluntly ending before reaching anterior margin; with more or less single row of decumbent squamules, shorter than those of head. Post genal process broadly, roundly widened at middle, abruptly dropping posteriorly; surface squamulose, sporadically at middle, more densely at margins. Posterior margin covered with single row of short, erect squamules. Procoxae with 2-3 squamules.

Hind body. — Coarsely punctured with large, shallow, well defined punctures; most punctures with posteriorly decumbent narrow squamules longer than those of head. Puncture size, depth, squamules, gradually getting smaller posteriorly. Mesosternum short, apophysis narrow, evenly rounded posteriorly; squamulose at edges; less punctured. (Metasternum not visible on specimen glued on point.) Marginal row of squamules on posterior margins of abdominal segments not conspicuous, not denser than rest of segments.

Legs. — Same color as body; middle pair slightly shorter than first; posterior largest. Densely covered with decumbent, narrow squamules about size of those of first abdominal segment. Squamular collar on end of tibiae golden-yellow, consisting of densely placed short squamules. Squamules on tarsi dense, same size as on tibia.

Length: 4.0 mm.

Distribution:

Holotype: labeled "Ari" in the USNM (No. 46395). Casey in his original description mentioned "Arizona (Tucson) Mr. Wickham".

This species resembles many species from Baja California and from mainland Mexico. I have examined several hundred specimens from Arizona, and neighboring areas from different collections which were identified as *fimbriatus*, none of them fits the description (even in a broad sense) of the type, which is a well preserved perfect specimen. Therefore it is known only from the type specimen.

Araeoschizus hystrix Papp, new species, Figs. 16a and 29.

With its large, anteriorly broad head; narrow, anteriorly evenly rounded prothorax; narrow shoulders, long, parallel sided elytra with erect, long, thin, squamules, it can easily be differentiated. Reddish brown, prothorax usually darker; shiny.

Head. — Slightly longer than broad across ocular lobes. Surface evenly, deeply punctured, distance between punctures less than their diameters; each with an erect, club-shaped, pale-yellow squamules. Preocular angle straight; frontal margin of head rounded. Ocular lobes very prominent, well elevated; so the ocular ridge; both very squamulose; the latter with a row of erect, longer squamules. Posterior angles less densely squamulose; squamules shorter and very sparse on the more finely punctured occipital impression which shallow, gradually shallower toward middle of vertex. Ocular groove shallow; portion anterior to eye is very short, posterior portion longer, shallow, with deep punctures of small size; space between punctures is slightly larger than their diameters; no squamules. Eyes darker, broad; with 20-21 facets dorsally, 5 ventrally. — Antennae narrow; joints rounded, well separated; very squamulose. Joint 1 same length as 2; 2 broader at anterior end; 3 half as long 2, broader than 4; 5-9 slightly shorter and narrower than 4; 10 about size of 3; 11 as narrow as 9, half as long as 10. Joints 1-6 with long, thick, others with much thinner squamules of same length; only 11 with hair thin squamules.

Prothorax. — One-fourth longer than broad at middle anterior half. Width of longitudinal groove is one-third the width of base of prothorax. Groove at posterior end deeper, shallower at anterior; margin elevated, with a row of erect squamules. Anterior margin straight; angle broadly rounded; broader in anterior half; about in middle gradually constricted; slightly broader at posterior angle, with row of erect, towards tip broader, pale squamules which are longest bordering anterior curvature, and denser on posterior margin where it is broken in middle opposite to center of longitudinal groove. Surface irregularly punctured, nearly granulose, with a very few erect, short squamules between margin and longitudinal groove.

Elytra. — Lighter brown than prothorax; about one-third longer than head and prothorax combined. Shoulder very narrow; scutellum well outlined. Sides parallel in middle third; posterior end not pointedly rounded. Primary cordae well elevated, with long, erect to slightly curved, narrow squamules, which are longer in the humeral margin; otherwise of even length especially on the marginal (viewed dorsally the third) corda. Secon-

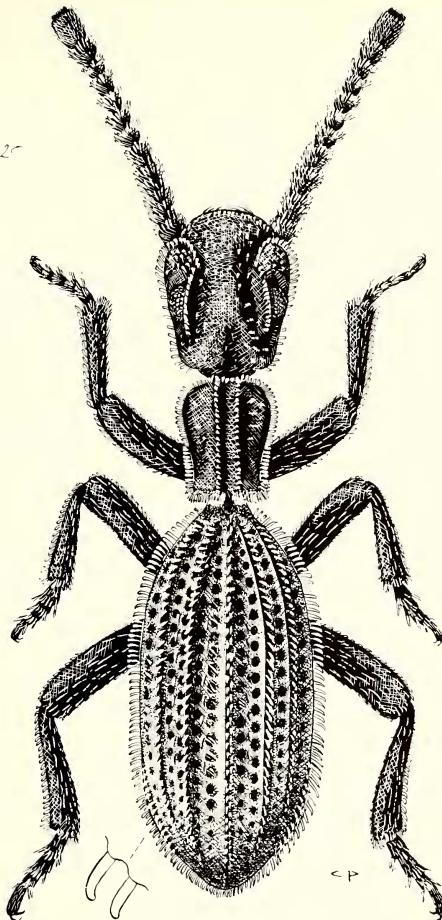


Fig. 29: *Araeoschizus hystrix* Papp, n. sp.

dary cordae not present; row of very sparse, short, posteriorly recumbent row of squamules between puncture lines. Primary cordae are entire anteriorly; posteriorly 1 is longer than 2; 3 joins margin behind 1; 4 is same in length as 2; marginal row short, originates in level of middle of third abdominal segment.

Underside.

Head. – Very finely punctured, very sparsely squamulose. Gular line shallow, almost flat, narrow in middle, broader, at base of sublabial plate forming the shallow, but wide, basal groove. Terminal joint of maxillary palpus of same length as preceding; slightly broadest at base. Post genal process long, narrowly pointed; sharply carinate at inner base; margin narrow, straight, squamulose. Mentum broadly rounded, about as

wide as long, surface with outwardly projecting thin, long squamules. Margin of pit of ventral portion of eye sharp; pit deep. Most squamulose on surface of process and mentum.

Prothorax. — Surface densely punctured; not squamulose. Prosternal ridge sharply elevated; shallower just before coxae; prosternal process broad, margin evenly rounded and highly elevated; middle of surface sharply impressed longitudinally; with decumbent short squamules on margins. Middle of hind margin not squamulose.

Hind body. — The whole surface with large, shallow, closely spaced punctures, very gradually and slightly decreasing in size and depth posteriorly. Each puncture with a long, one-and-one-half-times longer than diameter of puncture, posteriorly decumbent, thin squamules originating in the base of anterior wall of puncture. Edge of leytra slightly cordate and densely punctate, not squamulose. Mesosternal apophysis narrow, short, edge with squamules; surface slightly impressed; each carinate. Metasternal process flatly rounded, slightly smaller than the intercoxal process of abdomen, which is deeply set.

Legs. — Posterior pair longest, middle shortest; evenly densely covered with decumbent, narrow squamules, shorter than those on the abdominal segments. Squamules at exterior margin of femorae and tibiae are somewhat shorter, thicker, especially at the edges of the long, thin femoral groove, and on the exterior margins of tibiae. Tarsi thin, longer than broad, with spine-like pointed squamules. Tibial collar consists of a dense row of short, golden-yellow, pointed squamules.

Length: 3.9–4.1 mm.

Distribution:

Holotype: California, Riverside County, Joshua Tree National Monument, Pleasant Valley, Fried River Wash, March 27, 1965, E. L. Sleeper and S. L. Jenkins collectors. From CSULB, now in CAS.

Paratype: One specimen with same data, in CDFA.

Additional 3 specimens of the same location, collected August 27, 1967 by Sleeper and Jenkins collectors (2 in CSULB, 1 in CDFA); 3 specimens from Pinyon Wells, Joshua Tree National Monument, July 15, 1965, and September 25, 1965, also by Sleeper and Jenkins (CSULB).

Araeoschizus interjectus Papp, new species, Figs. 16b and 30.

Species intermediate between *limbatus* and *antennatus*. Dark brown, legs somewhat lighter. Squamules, especially on marginal regions, very conspicuous.

Head. — large, more than one-fourth longer than broad. Preocular lobes prominent; anterior portion of ocular groove small, postocular portion short, shallow. Ocular ridge prominent with sharp drop at posterior end of ocular groove; ridge with dense row of larger, erect squamules, longer than others covering head. Eyes with 15 facets dorsally, 5 ventrally. Vertex with shallow longitudinal groove, which appears deep between short, stubby erect squamules. Surface densely covered with shallow, round punctures, with

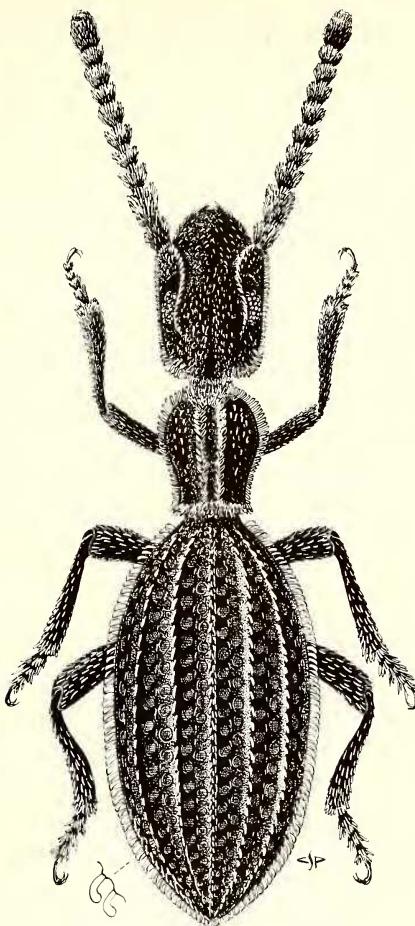


Fig. 30: *Araeoschizus interjectus* Papp, n. sp.

erect squamules which are slightly thicker, curved toward tip. Frons slightly convex at middle, frontal margin flat, with five long setae curvin slightly inward. — Antennae darker than head, almost black. Basal joint shorter than joint 2, but longer than 3, 4 combined; 4-9 uniform in size; 10 slightly broader than 9; 11 short, slightly narrower than 10, with surface covered with very fine grayish pubescence. Antennal joints densely covered with long, sharply pointed, semierect, hair-like squamules which from middle of each joint extends to base of squamules of next joint.

Prothorax. — One-sixth longer than broad; broader on anterior third; sides not quite parallel on posterior third. Margin, and two distinct longitudinal cordae in middle third of prothorax with long, dense row of erect squamules with blunt tips. Surface with longer, irregularly spaced, dense flat punctures with sporadically spaced short,

semi-erect squamules. Squamules at posterior margin slightly shorter, more dense than on sides.

Elytra. — Long, oval; shoulders flatly rounded, sides only at middle-third parallel; one-fifth longer than head, prothorax combined. From above three well defined longitudinal costae visible, covered with longer, erect squamules with rounded, slightly bent tips, which appear erect. Interspaces with two rows of larger, closely spaced puncture lines, with row of sparsely spaced, short, semi-erect, sharp pointed, hair-like squamules. Fourth corda visible only from the sides; corda 2 not entire, nor reaching tip of elytra, its ridge decorated with somewhat shorter squamules. Elytral margin smooth, posterior end decorated sparsely with shorter squamules.

Underside. — Surface of head with small, body with longer, loosely-spaced flat punctures. Head, pronotum sparsely, abdomen more densely covered with thin, recumbent, orderly arranged squamules, which are denser posteriorly, markedly denser at margins of abdominal segments. Sublabial plate of head is straight in middle, ending in prominent, black spine on each end; longitudinal groove originates just behind this plate, which is slender hour-glass shaped and deeper towards posterior end, with edges covered with semi-erect squamules.

Legs. — Slightly lighter brown than rest of body. Femora with distinct tibial grooves reaching to basal third of femur, with edges covered with row of recumbent, thin squamules, similar to *limbatus*. End of tibia with row of longer squamules, otherwise surface with shorter recumbent ones. Tarsal segments darker, almost black, with golden-yellowish, long, narrow squamules banding forward; apical segment covered densely with long, hair-thin paler squamules.

Length: 4.2–4.5 mm.

Distribution:

Holotype: Mexico, Baja California Sur, Las Parras, October 25 (year not given), collected by W. M. Mann in the nest of *Pheidole hyatti* (an ant). In the collection of CAS.

Paratype: Two specimens, with same data as holotype, of which one in the collection of LACM, and one in the collection of CDFA.

Additional two specimens from Comondu, Baja California Sur, collected in association with "yellow *Pheidole*", as noted on specimen label, collected by W. M. Mann. In LACM.

A slight variation noticed in the two specimen, one from Las Parras, the other from Comondu, where the two longitudinal ridges of the prothorax are not entirely parallel. The groove created by those two ridges seems slightly narrower at the middle, with slight resemblance to *antennatus*, from which it differs mainly in the ratio of the head and prothorax; the size and density of squamules, and the preocular lobe. The prominent marginal arrangement of squamules makes this species easily distinguishable from any other species of this isolated geographic area (LACM).

Araeoschizus lecontei Papp, new species, Figs. 16a and 31.

A slender, shiny, evenly squamulose, dark brown species. By its elongated large head, large eyes, narrower shorter prothorax, slender, parallel sided elytra with very prominent primary costae it can easily be differentiated from any closely related species.

Head. — One-fourth longer than broad at broadest point; sides slightly constricted at base of ocular lobes; narrower posteriorly. Surface deeply, densely punctured, each puncture with suberect, towards end broader, anteriorly pointing pale squamules. Ocular lobes prominent, broadly rounded exteriorly, densely covered with outwardly projecting squamules of same size as on rest of surface. Ocular ridge moderately elevated, with row of closely placed erect squamules. Frontal margin narrowly rounded, edge at middle sharply carinated, with 5–6 longer, hair-like squamules pointing, slightly curving

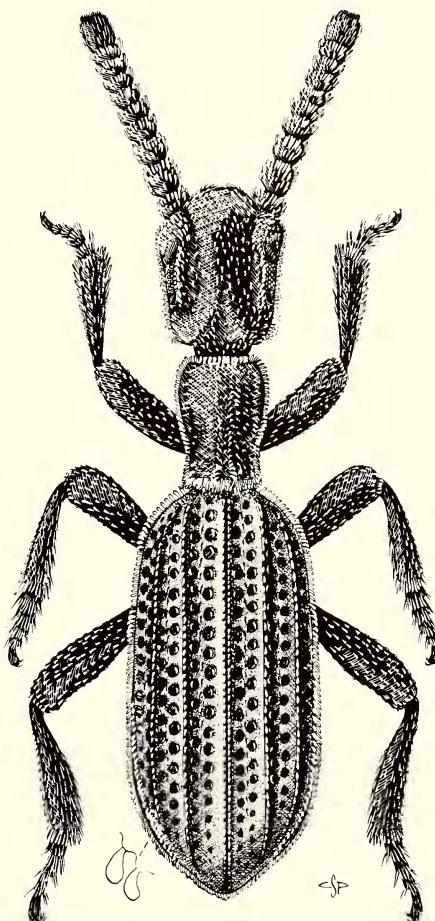


Fig. 31: *Araeoschizus lecontei* Papp, n. sp.

anteriorly on both sides of center. Angle of ocular lobe sharp; interior margin deep; bare. Ocular groove narrow, portion anterior to eye shorter; surface bold, less sparsely punctured. Eyes large, narrow, black; facets large, 21 dorsally, 5 ventrally. — Antennae slender, reaching just behind middle of prothorax. Joints well separated, broadly rounded, all evenly blackish-brown. Joint 1 longer than 2; 3 shorter than 2 but slightly longer than 4-9; 10 broader than long, slightly longer than 9; 11 half of 10. Squamulose; joint 1 with much shorter, narrower squamules than others; squamule size gradually narrowing from 4, hair-like on 10; fine on 11.

Prothorax. — One-sixth longer than broad at broadest point; twice as long as broad at posterior margin. Sides rounded behind sharply rounded anterior pronotal angle; slightly constricted in posterior half; posterior pronotal angle somewhat protruding exteriorly. Surface slightly darker than head; shiny; densely, closely punctured; punctures slightly larger than those of head; each puncture with curved, short, pale squamules pointing towards middle, converging on top of two marginal ridges of longitudinal groove, where more anteriorly projecting. Margins densely squamulose; squamules erect; golden-yellow; uniform size on sides, slightly longer on frontal margin (more so on anterior pronotal angle); arranged in several dense rows on posterior margin, unbroken at middle, instead squamules projecting toward elevated posterior end of two margins of longitudinal groove. Squamules on surface slightly thicker than those of head.

Elytra. — Slender, shiny; shoulder narrowly rounded, sides medially parallel, surface medially slightly impressed. Primary cordae prominent, edges with row of very dense, towards tip broader, semierect, short pale squamules which are slightly longer on anterior ends. Secondary costae indicated only by line of short, sparsely spaced semierect row of squamules which usually row in first interspace longest, others vary in length; 4 usually shortest. Punctures large, deep; spaces between less than half diameter of puncture. Minute, thin, hair-like squamule originating on anterior wall of puncture, not quite half as long as diameter of puncture. Sutural costa narrow, sutural groove deep; surface with row of densely spaced minute punctures; sutural costae prominent, with rows of squamules similar to primary costae.

Underside.

Head. — Shiny, dark brown; mandibles, margin, post genal process, pit of ventral portion of eye darker, almost black. Apical joint of maxillary palpus lighter brown, as galea. Mentum slightly broader than long; densely squamulose. Surface densely punctured, puncture irregularly shaped; each with forwardly projecting decumbent squamules of same size as dorsal side of head. Margin of submentum straight; process sharply pointed; inner base deeply carinate; squamulose. Basal groove of submentum triangularly shaped, with deep impression behind interior margin, then flatly narrowing posteriorly; punctured; squamulose.

Prothorax. — Same color as head, except margins black; shiny, densely punctured; each puncture with decumbent squamules about long as diameter of puncture. Prosternal ridge well elevated, roundly impressed at both sides near anterior end which barely reach anterior carina. Prosternal process narrower across anterior margin of coxal cavity; gra-

dually, evenly broader posteriorly; broadly rounded then sharply constricted, ending in sharp, narrow process behind coxae; densely covered with squamules slightly longer, broader than those on prosternal ridge.

Hind body. — Surface densely punctured; squamulose; shiny. Mesosternum short, with few deep, irregular punctures with no squamules. Mesosternal process narrowly constricted between coxal cavities, broadly, roundly extended behind coxae, densely squamulose, more so on posterior half. Metasternum deeply, triangularly impressed opposite narrow, sharply rounded intercoxal process of abdomen; moderately densely punctured with shallow, round, sharp-edged punctures; each puncture with posteriorly decumbent flat squamule, each reaching to margin of next puncture. Abdominal segments similarly punctured, squamulose; size of both gradually decreasing posteriorly. Middle of segment 2, marginal areas of 1, 3 slightly impressed. Marginal row of squamules detectable, well visible on segment 3. Squamules on anterior margin of 5 twice as thick as those on surface of 4. Shiny.

Legs. — Hind pair strongest. Slightly darker, uniformly covered with squamules of same size as on abdominal segment 5. Tibial collar consists of sparsely spaced, somewhat longer, sharply pointed squamules.

Length: 4.2–4.5 mm.

Distribution:

Holotype: Arizona, Cochise County, near Double Adobe, February 27, 1976, Scott McCleve Collector (CAS).

Paratypes: 11 specimens with same collection data; 1 in CAS, 4 in CDFA, 2 USNM, and 4 in the McCleve Collection (private).

***Araeoschizus limbatus* Blaisdell, Figs. 16b and 32.**

Blaisdell, Proc. Calif. Acad. Sci., 24 (7), 1943:214–215, plate 11, fig. 2.

Resembles *antennatus* Blaisdell, from which it differs by its larger size, longish head, shorter prothorax, broader, more parallel-sided body; by the dense row of broad-based, curved, erect, (at humeral area longer) squamules, and broad longitudinal groove on prothorax. Dark reddish-brown, prothorax slightly darker.

Head. — Slightly (one-eighth) longer than broad across prominent ocular lobe; one-fourth longer than prothorax. Surface minutely granulose; densely covered with short, erect, at tip forwardly curved clubshaped pale-yellow squamules. Frons flatly rounded, with six prominent annules having inwardly curved hairs; surface squamulose. Sides at posterior end about half as broad as head across ocular lobes; moderately compressed about level of anterior margin of eyes; closely squamulose. Vertex elevated at middle; longitudinal groove on posterior two-thirds present, not squamulose; posterior margin triangularly impressed at middle. Outer margin of ocular lobe broadly rounded; densely covered with recumbent squamules. Ocular ridge narrow, well elevated; edge densely squamulose. Ocular groove deep, long; portion anterior to eye deep; not squamulose, shiny. Eyes composed of large facets, 14–15 (not 25 as in Blaisdell, op. cit.) and 4–5 ven-

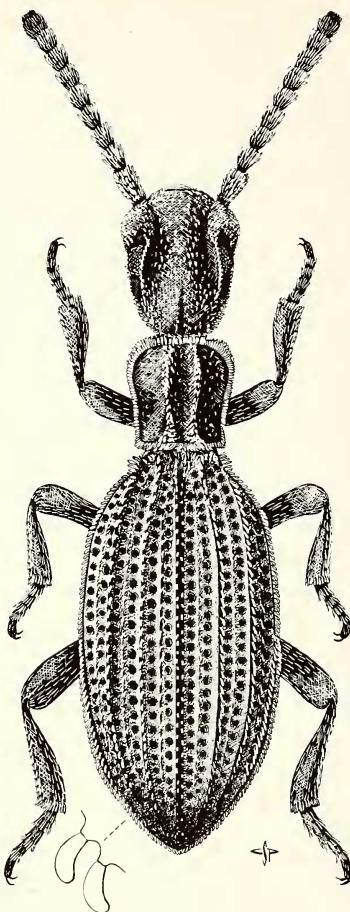


Fig. 32: *Araeoschizus limbatus* Blaisdell

trally. — Antennae robust, reaching to posterior fourth of prothorax; very densely squamulose. Joint 2 longest; 1 slightly shorter; 3 somewhat less than twice-size of 4; 4-9 broader than long, round; 10 about as long as 3, slightly broader; 11 short, flat; 10-11 covered with hair-like, others with thicker, golden-yellow squamules.

Prothorax. — Slightly longer than broad at broadest anterior half; margin slightly constricted in posterior third; with very densely spaced row of erect squamules. Longitudinal groove prominent; sides (ridges) not parallel, wider before middle, with disorderly placed erect squamules much shorter than those on margin. Anterior, posterior margin straight; latter several closely placed rows of squamules.

Elytra. — Twice as broad at middle as prothorax at widest point; half again as long as head, prothorax combined. Humeral area narrowly rounded, sides in middle-third par-

lel. Primary cordae prominent, secondaries not present. Primaries with dense row of erect, long, curved, club-shaped squamules. Secondary rows of squamules short, sparsely spaced; non-entire; 1 longest, 3 shortest. Sutural lines with similar but slightly more densely spaced squamules.

Underside.

Head. — Very broad gular line reaching to basal groove of submentum with densely squamulose posterior margin. Surface sparsely punctate, each puncture with long, narrow, parallel-sided, forwardly decumbent squamule. Maxillary palpus covered with prominent squamules, which are thinner only at apex. Mentum slightly longer than broad; squamulose. Post genal process prominent; sharply pointed, interior base deeply, broadly carinate, margin short; densely squamulose.

Prothorax. — Surface with longer punctures than those on head, smaller than those on metasternum. Prosternal ridge prominent, more elevated at anterior end, not reaching margin of prothorax; prosternal process broad, longitudinally impressed at middle; squamulose. Surface with very few short, decumbent squamules.

Hind body. — Densely squamulose; more so posteriorly. Mesosternum very short, narrow mesosternal process with decumbent squamules. Mesosternum with larger punctures, each puncture with long, posteriorly decumbent squamules; anterior middle between coxae elevated, posterior middle convex. Abdominal segment 1 with much larger, flat, sharply edged punctures, space between punctures less than half diameter of punctures, segment 2 similarly punctured, from 3 posteriorly size, depth of punctures decreasing so that on 5 puncture about one-third size as on 1; length of squamules also decreasing.

Legs. — First, middle about same size, hind pair larger. Densely squamulose throughout; squamules on exterior edge of tibiae somewhat thicker, more densely spaced. Ventral portion of tarsi with densely spaced, narrower squamules than those on dorsal side; all segments densely squamulose.

Length: 4.5–5.0 mm.

Distribution:

Holotype: Mexico, Baja California Sur, Todos Santos, July 15, 1938, Michelbacher and Ross Collectors (CAS).

Paratype: Same data. One specimen (CAS).

Blaisdell mentioned (op. cit. p. 215) numbers of type specimens 5086 and 5087 respectively, which labels are not attached to the specimens.

Additional specimens. 1 specimen from 12.4 mi S of La Paz, Baja California Sur, March 2, 1969, R. R. Snelling Collector (CSULB); 3 specimens from El Pescadero, Baja California Sur, April 16, 1979, M. Wasbauer Collector (CDFA).

***Araeoschizus squamulissimus* Papp, new species, Figs. 16b and 33.**

A striking, easily recognizable species, with prothorax, head and antennae densely covered with goldish-yellow, long, narrow squamules. Dark brown, almost black, and large.

Head. — One-fourth longer than prothorax. One-fourth longer than wide. Surface shiny, very densely covered with elliptically shaped deep, flat punctures. Ocular lobe prominent, with broadly rounded angle; deep, wide, long reaching to rounded occipital region; surface not squamulose; minutely granulose. Ocular ridge highest about eye level, margin densely covered with erect, toward their tips broad, squamules of same size as ocular lobe, margin of head. Frons convex at middle, sharply impressed toward interior margin of ocular lobe; preocular angle broad; outer margin light brown, frontal margin

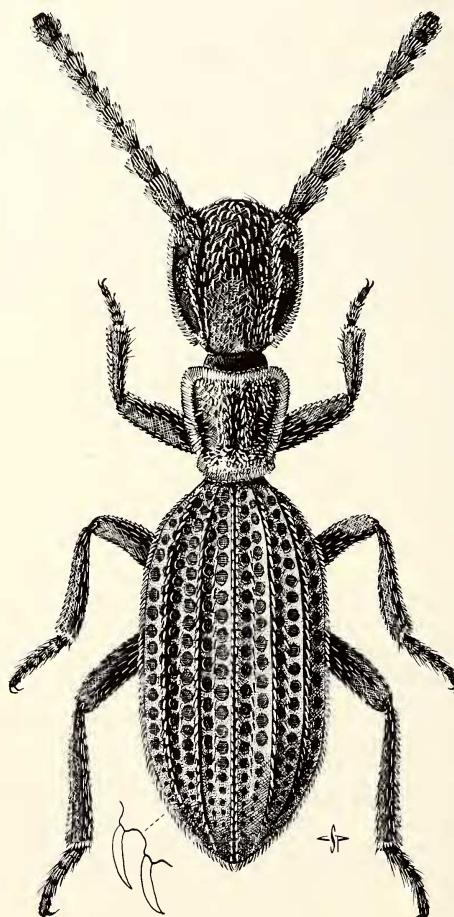


Fig. 33: *Araeoschizus squamulissimus* Papp, n. sp.

with shallow corrugation, 4–5 inward curving hair-like bristles. Surface densely covered with toward their tips broader squamules; on vertex mostly placed with narrow edge upward (in dorsa view they appear narrow), occasionally when disturbed, their broader side visible dorsally. Vertex convex, occipital impression very shallow; slight perpendicular impression between vertex, frons. Frons densely squamulose, less convex than vertex. Surface with large, forwardly decumbent golden-yellow squamules; more erect, suberect toward occipital region, on margins of head. Eyes deeply set, large; 19 facets dorsally, 5 ventrally. – Antennae not quite as long as head, prothorax combined. Basal joint slightly narrower than 2; 2 about one-third longer than 3; 3 longer than 4; from 5 gradually smaller to 9; joints 1–9 round; 10 broadly flattened; 11 almost half as wide as 10, about one-third as long, tip flat. Squamules long, semierect to recumbent along anterior half of joints; golden-yellow. Joints 10, 11 slightly lighter brown; antennae gradually darker towards base; 10 with fine, hair-like slender squamules; 11 more so; tip plumose with few pale hair-like squamules along edge of tip.

Prothorax. – Shorter than head. About one-fourth longer than wide at widest point. Anterior margin protruding forwardly in middle, constricted toward sharply rounded anterior angle. Sides slightly constricted behind middle; posterior angle straight. Median longitudinal groove entire, shallow, longitudinal ridges broad, yet broader anteriorly. Surface similarly textured to that of head. Edges with several rows of dense, erect, darker-yellow squamules, more dense, numerous on posterior margin. Surface squamulose, squamules forwardly recumbent on ridges; more inwardly projecting on sides.

Elytra. – About one-third longer than head, prothorax combined. Shiny. Primary cordae prominent with row of sharply pointed, posteriorly recumbent yellow squamules. Interspaces with two rows of deep, large punctures. Secondary row of squamules short, present only in the interspaces 1, 2; longer in 1, about half as long in 2. Sutural groove very narrow, lines of squamules dense, overlapping each other as on primary cordae, but slightly shorter; joining corda 1 at anterior base; 1 joins 2; 3 usually free; 4 slightly shorter. Posteriorly corda 3 longest, joining margin about end on shorter 1; 2, 4 shorter; cordated elytral margin with squamules from about posterior margin of abdominal ring 2. Marginal fold with two rows of puncture lines, exterior line smaller.

Underside.

Shiny; head, prothorax dark brown, almost black; abdominal portion somewhat lighter. Surface punctured, moderately squamulose.

Head. – Gular area flat; gular line narrow, deeply impressed into groove of submentum. Surface in anterior two-third with pale, narrow, decumbent squamules. Submentum prominent; proboscis short, narrow; margin straight or nearly so. Mentum small, surface flat, punctured, with outward projecting golden-yellow, long squamules. Maxillary palpus lighter brown, joint 3 squamulose; apical joint longer, broader than 3, broadest at basal fourth, shiny, with very narrow and flat tip.

Prothorax. – Sparsely covered with large, deep punctures. Prosternal ridge not prominent; sparsely squamulose. Prosternal process broad, surface with long, narrow, disorganized, decumbent squamules. Margin straight anteriorly, broadly carinated

posteriorly; with several rows of long, golden-yellow squamules; posterior margin squamulose only near posterior angle. Otherwise bald.

Hind body. – Very densely covered with large, evenly rounded punctures. Metasternum with smaller punctures, bold, except very narrow mesosternal process bearing a few squamules along edges, 2 or 3 on the middle. Metasternum with large punctures, squamules as mentioned above. Metacoxal process broadly-triangularly rounded, impressed in anterior middle with joining portion of metasternum. Segment 1-3 about evenly punctured, size of punctures however slightly smaller toward posterior of body; very minute on 4, 5; similarly squamules. Marginal row of squamules not prominent, present on posterior margins of segments 1, 2, 3, hardly visible on 4. Squamules, as a rule, slightly longer toward external portion of abdominal rings; very fine on 5.

Legs. – Front leg shorter, with much thicker femora than others. Hind pair largest. Tibial groove on frontal femur broad, shallow, hardly half as long as femur; on middle slightly longer; on hind femur shortest. Evenly, sparsely covered with pale, thin, decumbent squamules. Tibia shortest on anterior pair, more densely covered with squamules than femur; with row of broader recumbent squamules exteriorly, with narrower interiorly, with 4-6 erect, somewhat longer spine-like squamules toward end; tip angularly rounded with short, dense, spine-like squamules. Other two pairs similar; posterior longest. Tarsal segments densely covered with long, sharply pointed squamules, longer than joints. Apical segments as long as two previous combined, also densely covered with hair-like squamules.

Length: 4.5-5.0 mm.

Distribution:

Holotype: Mexico, Baja California Norte, Diablo Dry Lake, July 16, 1979. Collected by Derham Giuliani. In the collection of the CAS.

Paratype: 16 specimens with same data as holotype. In the CDFA collection.

***Araeoschizus wasbauerorum* Papp, new species, Figs. 16c and 34.**

Easily differentiated from other species by its black color, small prothorax and pale white squamules.

Head. – Large, about one-fourth longer than broad, broadest at ocular lobe, as broad as length of prothorax. Preocular angle prominent, sides at base slightly leaning outward, then broadly, flatly rounded anteriorly. Ocular lobes prominent with pointed angles. Anterior portion of ocular ridge very low, gradually higher posteriorly, highest at level of anterior half of eye, then sharply dropping posteriorly. Enclosed ocular groove prominent, deep, anterior portion short, posteriorly as long as eye, gradually narrowing anteriorly. Occiput very narrowly rounded; occipital impression short, deep; deeply impressed longitudinal center line reaches behind posterior end of ocular groove. Surface densely covered with deep, round punctures, each with forwardly decumbent, at base narrower, towards tip broader, whitish squamula. Squamules more dense, upwardly pointing along sides of ocular ridge. Slightly brownish-black at frons. Vertex slightly

elevated, more roughly punctured, prominent impression at base of anterior margin of ocular lobe; frons almost smooth, shiny. Eyes large, 18 large ocelli dorsally, 5 somewhat smaller ventrally. — Antennae long, reaching to posterior fourth of prothorax. Joint 1, 2 about same size, 3 shorter than 2, 4 shorter than 3, but same size as 5, 6, 7; from 8, 9, 10 gradually broader; 10 broadest; 11 about half as long as 9. White squamules broader on 1–3; from 4 on gradually narrower, longer; 10 with few hair-thin squamules; 11 almost plumose. Joints 1–6 round, 7–11 compressed laterally.

Prothorax. — As long as head broad at ocular lobes; about one-fifth longer than broad before middle. Frontal, hind margins straight; anterior pronotal angle rounded, sides curved exteriorly, slightly contracted behind middle, ending in sharply pointed posterior pronotal angle. Black, shiny, surface very coarsely rugulose. Two longitudinal

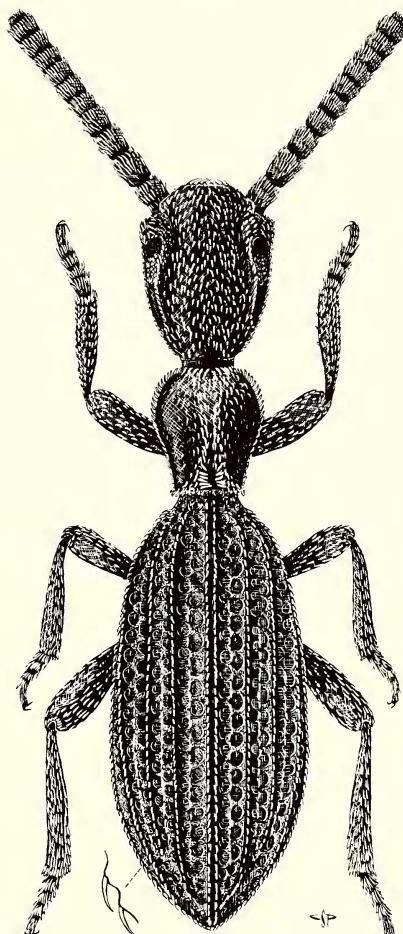


Fig. 34: *Araeoschizus wasbauerorum* Papp, n. sp.

ridges enclosing groove prominent, parallel, evenly broad, covered with forwardly decumbent pale squamules, which are radially placed on posterior end of ridges. Exterior sides of ridges deeply impressed about middle, then surface between ridge, margin of prothorax sharply convex anteriorly. Edge of prothorax with dense, semierect squamules; squamules slightly shorter at posterior half.

Elytra. — Long, narrow, black. More than twice as long as broad; one-third longer than head, prothorax combined. Shiny, black. Primary costae prominent, edges sharply corrugated, each elevation with sharply pointed, posteriorly decumbent, curved, pale squamule, which are shorter, more decumbent on smooth sutural lines, same size as secondary row of squamules. Between primary costae two rows of puncture lines; punctures large, deep, closely spaced, between rows secondary row of decumbent, short, pale squamules. On anterior portion of wall of deep punctures a fine, short, sharply pointed, straight squamula directed posteriorly. Primary costa 3 joins margin behind end of slightly shorter 1, 2 shorter, 4 slightly longer than 2 but shorter than 1. Secondary row of squamules all short; 1 longest, 3 shortest, all present on posterior two-third of length of elytra.

Underside.

Head. — Very coarsely granulated, sparsely covered with long, evenly thick, forwardly decumbent pale squamules. Mentum large, evenly rounded, densely covered with outwardly radiating squamules slightly shorter than generally, with few thin, longer squamules at middle, on frontal margin. Maxillary palpus large, light-brown, terminal joint almost twice size of previous; joint 1, 2 finely squamulose, 3 without squamules, with flattened plumose end. Mentum, palpi, small labial palpus light yellowish-brown. Mandibles large, shiny black. Submentum flat, deeply retracted between very prominent proboscis on both sides; basal groove extremely deep, at base continuing as groove on inner base of process; deeper behind flat frontal margin, than extending in half circle posteriorly for a distance equal to length of frontal margin; process densely squamulose, frontal margin with shorter, large basal groove with longer, decumbent squamules. Gular area large, almost smooth, with two longitudinal impressions behind middle. Most specimens with inner base of post genal process very distinctly, deeply carinate, making margin somewhat short; those carinae smooth, never squamulose.

Prothorax. — Black, or dark blackish-brown. Narrow, surface with large; deeply set even punctures. Prosternal ridge high especially posteriorly; prosternal process high, abruptly dropping behind coxal cavity enclosing a small subprosternal cavity, vertically dropping into posterior ventral margin of prothorax. Only prosternal ridge, very broad process, squamulose, latter more so, with an orderly row of decumbent squamules on margin. Procoxae glabrous. Punctures slightly larger near densely squamulose margin, which is broadly rounded at posterior end; short squamular lines on ventral margin not reaching middle.

Hind body. — Dark blackish-brown. From anterior margin of mesosternum to posterior margin of third abdominal segment surface densely covered with large, flat punctures, each puncture with long, narrow, pale, posteriorly decumbent squamule orig-

inating just below edge of each puncture; each squamule longer than diameter of puncture. Abdominal segment 4 almost smooth, with very small, faint puncture-like impressions, with shorter, decumbent squamules; segment 5 similarly surfaced, except punctures much smaller, squamules slightly denser, shorter. Metasternal process narrow, slightly broader at end, posterior margin flat. Intercoxal process of abdomen pointedly rounded, deeply impressed at anterior middle. Ventral sides of meso-, metacoxae squamulose.

Legs. – Long, slender, squamulose, black or very dark brown. Middle pair shorter, hind longer; front femora usually heaviest. Evently – densely covered with narrow decumbent squamules. Tibia with more recumbent squamules which are erect toward end, especially on posterior margin and ventral side of tibiae. Tarsi evenly covered with somewhat longer, thicker squamules than tibiae.

Length: 4.8–5.1 mm.

Distribution:

Holotype: Mexico, Sonora, 6 miles N of El Golfo. April 10, 1973. Collected by M. S. and J. S. Wasbauer; in cereal bowl pit trap. In the collection of CAS.

Paratypes: 100 specimens with same data. Distributed from the CDFA collection to several institutions supported the present study by loaning their *Araeoschizus* specimens.

Key to the Species in Group IV.

- 1 Head long as broad at broadest point 2
- Head longer than broad 6
- 2 Prothorax shorter than head 3
- Prothorax slightly longer than head, broad 4
- 3 Prothorax as broad as head; longitudinal groove narrow; surface densely squamulose, more so on posterior margin. – Length: 3.7–4.2 mm. (Navajo, Pima, Graham Counties in Arizona; probably also in northern Sonora, Mexico)
..... *regularis* Horn
- Prothorax narrower than head; longitudinal groove broad; surface sparsely squamulose 5
- 4 Longitudinal groove of prothorax sharply constricted at middle, anterior portion broadly flat, posterior much deeper; densely squamulose; margins with dense row of squamules, more so on posterior margin. – Length: 4.5–4.6 mm. (Pima County, Arizona) *colossal* n. sp.
- Longitudinal groove of prothorax parallel, slightly shallower anteriorly; squamules on anterior margin longer, denser than on sides; denser yet on posterior margin; surface sparsely squamulose. – Length: 4.0 mm. (S. California)
..... *simulans* Csy.

5 Width of longitudinal groove of prothorax is more than one-third length of base of prothorax; slightly broader anteriorly. Margin of prothorax sharply constricted at posterior fourth, broadly rounded anteriorly where it is more squamulose. Marginal squamular line dense, less so on posterior margin where at middle a slight indentation of squamular tufts is present; surface densely squamulose. – Length: 3.6–4.0 mm. (Kern and Inyo Co., California; Nye Co., Nevada) *sulcicollis* Horn

– Width of longitudinal groove of prothorax less than one-third of posterior margin; parallel, uniformly deep. Margin of prothorax in anterior curvatore densely squamulose; two tufts at both sides of posterior end of longitudinal groove are well developed; surface moderately densely squamulose. – Length: 4.0 mm. (Mexico, Guerrero State) *mexicanus* Champion

6 Margin of prothorax angularly curved on sides, anterior and posterior margins slightly protruding exteriorly; longitudinal groove parallel sided. Surface squamulose; margins densely squamulose; squamular tufts at middle of posterior margin of prothorax present. Head pointedly rounded posteriorly. – Length: 4.5 mm. (Mexico, Acatlan) *dolenterus* n. sp.

– Margin of prothorax slightly constricted in posterior half; twice as long as broad at posterior margin; slightly narrower and shorter than longish, narrow head; edges of longitudinal groove margins densely squamulose. – Length: 5.0–5.4 mm. (Mexico, Cuencame State) *expeditionis* n. sp.

***Araeoschizus colossalis* Papp, new species, Figs. 16a and 35.**

Easy to differentiate from other species of this group by the uniformly short, stubby squamular cover on head and prothorax; by the anteriorly broadly flat longitudinal groove of the prothorax; the deep, smooth interspaces with small sharp puncture lines. Dark brown, shiny.

Head. – About as long as prothorax, slightly longer than broad; sides nearly parallel. Surface very finely punctured, uniformly densely covered with short, club-shaped, forwardly decumbent pale squamules, slightly longer at anterior third, margin of frons, with bristle-like squamules on flat, corrugated frontal margin of head. Ocular lobe prominent, yet with broadly rounded exterior angle; minutely punctured, squamulose; interior margin deep, broad, bare. Ocular ridge prominent, densely squamulose. Ocular groove deep; anterior portion broadly, posterior narrowly rounded, margin densely squamulose; surface minutely punctured. Occiput narrowly rounded, short; occipital impression consisting of deep, narrow impression which continues into anterior portion of vertex. Eyes with 17–18 facets dorsally, 6–7 ventrally. – Antennae robust, reaching near end of prothorax. Joint 1 size of 2; 3 slightly longer than 4; 4–9 about even; 10 slightly longer than 9; 11 slightly shorter than 9; 5–10 with longer, broader squamules than 1–4; 11 with few narrow squamules at base, otherwise plumose.

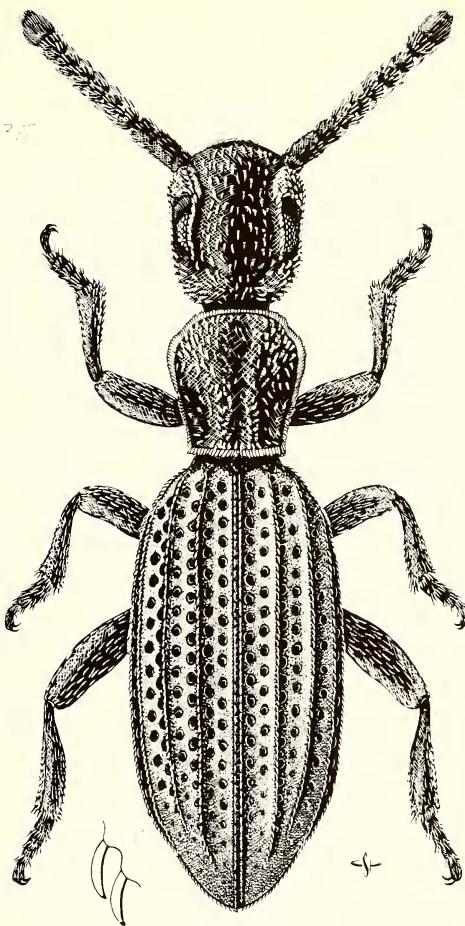


Fig. 35: *Araeoschizus colossalis* Papp, n. sp.

Prothorax. – Slightly longer than broad, broadest in anterior half. Surface densely punctured, evenly covered with short, decumbent, club shaped squamules, which are somewhat longer, denser at both sides of posterior end of longitudinal groove. Anterior margin flatly rounded; pronotal angle posterior third of sides constricted, with prominent, sharp posterior pronotal angle; posterior margin nearly straight. Margins very squamulose, more so on anterior, posterior. Longitudinal groove deep posteriorly, broadly convex anteriorly; its posterior sides around base more densely squamulose. Margins black or blackish-brown.

Elytra. – About one-fourth longer than head, prothorax combined; flatly compressed at middle. Longitudinal cordae narrow, highly elevated, corrugated edge with dense row of posteriorly decumbent squamules halfway overlapping each other. Ridge 1 ends before tip of elytra; 2 shorter than 1; 3 joins marginal (4) costa behind end of

2. Two puncture lines in each interspace deep; punctures with rounded (not sharp) edges; distance between greater than diameters of punctures; size gradually decreasing, distance increasing toward tip of elytra. Surface shiny, evenly very minutely granulose.

Underside.

Head. — Densely covered with irregular, small, elongated punctures, some in genal area with short, pale, decumbent squamules. Gula smooth, triangular, flat (not convex); gular line slightly impressed, abruptly broad anteriorly, flat, U-shaped with straight anterior margin parallel with margin of submentum (widest, deepest of all species). Mentum large, flat, about as broad as long, surface with exteriorly protruding suberect, short, club-shaped squamules of almost same length as those of femora. Maxillary palpus dark reddish-brown, anterior half of each joint black, sparsely squamulose. Post genal process very prominent, inner base deeply carinate, margin broad, slightly impressed in middle. Margin of pit of ventral portion of eye black, sharply elevated, facets deeply set.

Prothorax. — Bald; edges black; irregularly covered with punctures larger than those of head. Prosternal ridge on anterior half highly elevated, abruptly ending before anterior margin of prothorax, where distance between becomes flatly convex. Prosternal process very broad; margins densely, surface (including the prosternal ridge) sparsely squamulose. Margin of coxal cavity sharply elevated.

Hind body. — Dark brown; densely covered with large, flat punctures, each with narrow, posteriorly decumbent squamules. Mesosternum extremely short, about one-fourth of metasternum; surface smooth, with few shallow punctures; apophysis narrow, anterior edge squamulose, posterior edge convex, not squamulose, abruptly ending, sharply dropping to rounded edge of metasternal process; ventral surface of mesocoxae densely squamulose. Mesosternum deeply convex in posterior middle; surface with large, closely spaced punctures, each with a posteriorly decumbent squamule slightly longer than diameter of punctures; margins black. Abdominal segments densely punctured with squamule decreases posteriorly; segment 4 less than half width of 2; on 2-5 squamules not longer than diameters of punctures; size of punctures, squamules not longer than diameters of punctures. Marginal row of squamules not present.

Legs. — Anterior pair heaviest, posterior largest, middle smallest. Femur uniformly squamulose; tibia with longer, heavier squamules in ventral edge, which become gradually larger posteriorly; tibial collar consists of short, sharply pointed squamules. Tarsi sparsely squamulose.

Length: 4.0-4.1 mm.

Distribution:

Holotype: Arizona, Pima County, Colossal Caves Park, February 19, 1972, D. S. Chandler, collector. In CAS.

Paratypes: 23 paratypes of same location, are in CDFA (4), USMN (2), AMNH (2), CAS (2) and in the DC collection (10).

Araeoschizus dolenterus Papp, new species, Figs. 16c and 36.

Superficially resembles *mexicanus*.

Head.—Shiny; about one-fourth longer than prothorax. Anterior margin more narrowly pointed than in any other species (flat in *mexicanus*), with 4–6 longer, hair-like, converging bristles at middle. Preocular lobe large, elevated exteriorly; ocular groove very deep, minutely punctured, anterior margin evenly curved, posterior half even in length with anterior, internal edge continuing in slightly elevated, curved, somewhat recumbent ridge near behind eye. Groove at internal base of preocular lobe is moderately deep, short, with anterior end very clearly separates preocular lobe. Surface almost smooth, punctuation not visible unless the extremely short, slightly curved, recumbent squamules removed. Densely, evenly squamulose, slight longitudinal impression about

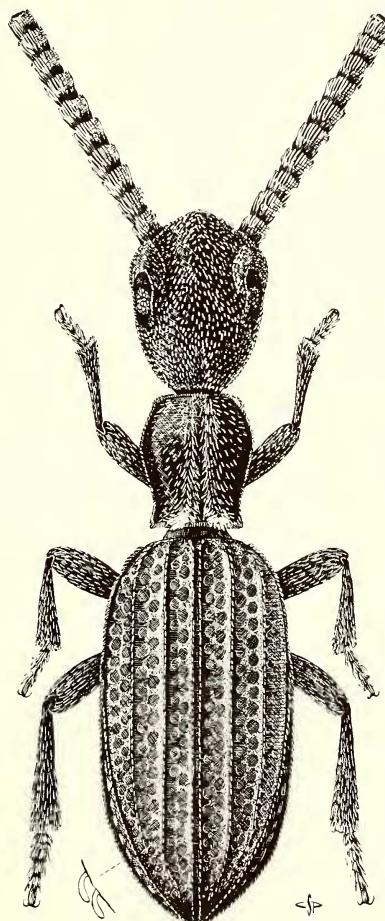


Fig. 36: *Araeoschizus dolenterus* Papp, n. sp.

base of head; occiput slightly elevated, only very slightly dropping forward. Eyes very small, broad, with about 14 facets drosally, 5 ventrally. — Antennae robust, tightly jointed, almost black, densely covered with spear-shaped goldish-yellow squamules leaving only base of joints free; joint 2 shorter than 3, 4 combined; 5-9 shorter than 4; 10 about size of 2; 11 extremely short, flat and plumose.

Prothorax. — Similar to *mexicanus* in shape, only anterior angles more broadly rounded, widest at about middle of anterior two-thirds, obliquely narrowed posteriorly. Two longitudinal ridges shallow, slightly more elevated posteriorly, groove-like interspace similarly so; blunt ridge with semierect, slightly longer squamules than those of head, placed partially perpendicular on sides of ridges, leaning forward in anterior third, some densely towards end. Frontal, hind margins with longer, sides with shorter sharply blunt, erect squamules. Surface with larger punctures than head, most punctures with short recumbent squamules, those near side margins with very minute, or no squamules. Color same as head.

Elytra. — Lighter brown than head, prothorax. Surface shiny. Slightly depressed in middle. Little more than twice as long as wide, sides about middle one half parallel, shoulder more sharply, posterior end more broadly rounded; slightly convex at middle. Three longitudinal costae sharply elevated, slightly converging anteriorly, more so posteriorly; their ridge with short, narrow, bluntly-rounded, curved, semierect squamules. First corda longer than 4 (marginal in dorsal view), 2 shorter than 4; 3 fuses with very shallow marginal costa which in posterior fourth covered with very minute squamules; costal margin seemingly fused with premarginal costa, covered with narrow squamules twice as long as those on abdomen, placed perpendicularly to margin. Interspaces with two rows of alternately placed, very shallow circular punctures. Surface shiny, very slightly depressed in middle.

Underside.

Head. — Dark brown, all marginal areas black. Maxillary palpus short, thick; terminal joints light-amber; anterior margin of basal segment with minute squamules. Mentum large, about wide as long; convex medially with outwardly projecting, decumbent, yellow squamules. Submentum hardly detectable, short, basal groove indicated only by prominent roundish impression; process prominent, inner base deeply carinated, tip sharply pointed, squamulose. Gula flat, bare, extending anteriorly to nearly middle of head. Surface densely punctured; punctures small, each with anteriorly decumbent, orderly placed thin squamule; squamules on margin of head, posterior portion, and near base of gula shorter, thicker, more recumbent, club-shaped.

Prothorax. — Smooth; dark brown, edges black. Surface sparsely covered with minute sharp punctures; some with short squamule. Prosternal ridge sharp, triangularly elevated; shallower before anterior portion of medially sharply constricted, sparsely squamulose post genal process.

Hind body. — Mesosternum short, surface smooth, with deep, large, round punctures, each puncture with posteriorly decumbent squamule about twice as long as puncture diameter. Intercoxal process flat. Surface of abdominal segments between sparsely

spaced large punctures smooth, shiny; size of punctures gradually smaller posteriorly; each puncture with squamule; those on sides of segment 1-3 as long as diameter of puncture; squamules on 4-5 longer; on 5 about twice diameter of puncture. Marginal row of squamules hardly detectable.

Legs. - About same size. Uniformly densely covered with pale-yellow decumbent, long squamules as long as on abdominal segment 5. Tibial collar short, consisting of very densely spaced short, pale squamules.

Length: 4.5 mm.

Distribution:

Holotype: Mexico, Acatlan Province, 45 mi. N of Puebla, July 30, 1963, D. J. Doyen, collector (CAS).

***Araeoschizus expeditionis* Papp, new species, Figs. 16c and 37.**

Very dark brown, the large head and relatively small and narrow prothorax are almost blackish-brown; the preocular lobe is prominent. A slender, large species.

Head. - Almost one-fourth larger than prothorax, very dark brown, nearly black, densely covered with slightly recumbent, short, downward curving squamules with somewhat rounded, broader tips. Squamules erect only on marginal regions of head, and edge of ocular ridge. Center half of frontal margin is straight, prominently annulated, its sides sharply curving toward broadly rounded anterior margin of large preocular lobe. About widest of anterior fourth over the preocular lobe, then sharply curved toward deeply-set eyes, from this point very gradually narrowing posteriorly into sharply rounded tempora. Vertex slightly elevated, with broad, shallow longitudinal impression posteriorly. Eye pit very short, anterior part with prominent triangular margin at base of preocular lobe, posterior portion slightly longer, rounded end not reaching behind longitudinal, slightly curved, sharply elevated ocular ridge which is irregularly edged with erect, blunt squamules the same size as those of marginal outline of head. Dorsal portion of eye with 21-22 facets, ventral portion with 4-5 facets. Surface of head shiny, each squamules sitting in shallow, circular pit. - Antennae stubby, joints broad; 1 longest; joints 2, 3 of equal length, others shorter; 10 slightly longer, broader as 9; 11 short, smaller than others, densely covered with thin, pale hairs; squamules of joints dense, long, lending a plump appearance to antennae.

Prothorax. - Nearly one-fourth shorter than head, widest before middle, frontal corners broadly rounded, sides about posterior third nearly parallel. Edges densely covered with squamules, especially on posterior margin, where they are in several irregular rows; erect, longer than those on surface of prothorax. Medium longitudinal pair of costae very shallow, very slight impression between, which may appear prominent due to orderly arrangement of somewhat longer squamules, others much shorter, thicker, more sharply curved, recumbent. Surface with large circular pits with goldish-yellow squamules in each, with exception of area between two shallow longitudinal ridges, where they are partially absent, or if present, insignificantly short, somewhat denser posteriorly.

Elytra. — About one-fifth longer than head, prothorax combined; about one-third longer than wide; shoulders obliquely rounded. Surface shiny, quadricostate, interstices with two rows of alternately placed large punctures. Costae highly elevated, lined with dense row of erect towards tip slightly curved squamules. Costa 1 longer than 2; 3 ends shortly before end of elytra; 4 about length of 2; elytral marginal costa (one row of punctures between marginal costa and margin of elytra) prominent.

Underside.

Head. — Dark brown, shiny. Maxillary palpus short, lighter reddish-brown; two basal joints squamulose. Mentum small, not quite twice as broad as long; anterior margin rounded; squamulose, especially margins of sides. Submentum small, margin slightly impressed at middle; process prominent, broad, sides in basal half parallel, inner base

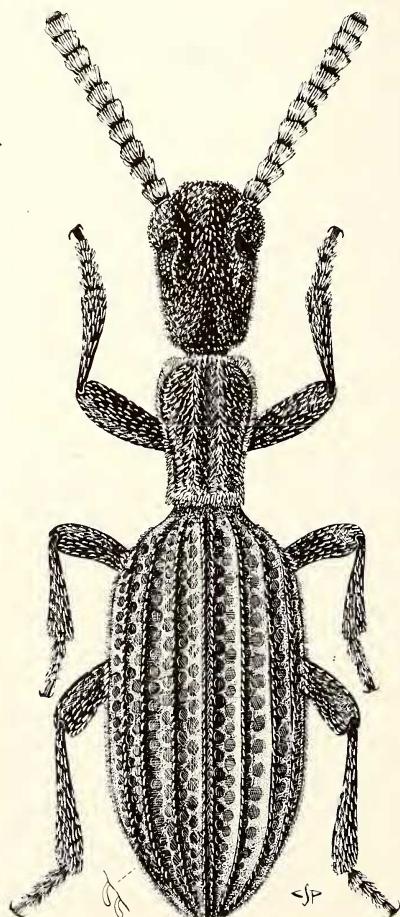


Fig. 37: *Araeoschizus expeditionis* Papp, n. sp.

deeply carinate; squamulose. Basal groove of submentum deep, triangularly pointing posteriorly into bold, broad gular line; gula broader at base, visibly impressed at anterior end. Surface punctured; evenly covered with short, anteriorly decumbent pale-yellow squamules.

Prothorax. — Reddish-brown medially, otherwise blackish-brown; smooth, throughout densely punctured, sparsely squamulose. Prosternal ridge prominent, not reaching anterior margin of prothorax. Prosternal process sharply constricted between coxae; broadly rounded posteriorly; squamulose.

Hind body. — Mesosternum extremely short, bold; only very narrow highly elevated mesosternal process squamulose. Metasternum short, half length of first abdominal segment; densely covered with small, deep punctures, each puncture with long, posteriorly decumbent narrow squamule; squamules on sides slightly thicker, shorter. Abdominal segments with larger punctures, size slightly decreasing towards posterior; each puncture with long, thin, pale-yellow, posteriorly decumbent squamule, squamules thicker on segment 1, thinner on 5. Marginal row of squamules more or less detectable, especially on segments 4, 5.

Legs. — Front pair more strongly built than posterior, median pair smallest; densely covered with recumbent narrow, slightly longer squamules. Tibial pit beneath femur deep, gradually sloping, narrowing posteriorly, edges densely covered with recumbent, curved squamules. Tarsal segments lighter brown, broader ends with orderly row of fine, short squamules.

Length: 5.0–5.4 mm.

Distribution:

Holotype: Mexico, Cuencame District, Durango, Jerbanis, 6700 ft. elevation, August 19, 1947. Collected by Dr. Gertch, The David Rockefeller Mexican Expedition. In the collection of the AMNH.

Paratype: One specimen, same data as holotype. In the CDFA collection.

Araeoschizus mexicanus Champion, Figs. 16c and 38.

Champion, Biologia Centrali-Americana, Coleoptera 4 (1); 1892:491, Plate 22, Fig. 3.

This is the first species described from Mexico. With the following notes made from the holotype (BMNH), I would like to add some details to the original description. The illustration may help one to recognize this castaneous brown species.

Head. — One-fourth longer than wide, front somewhat flattened but still with well distinguishable preocular lobe, narrowly rounded anteriorly. Ocular pit very short, rounded in front deeply set eye with 15 facets dorsally, 5 ventrally, longer behind eye, and continuously prominent and running parallel with the sides of head behind the eye. Broadly rounded both front, back, in vertical view somewhat flattened in center of frontal margin. Side broadest at preocular lobe, slightly constricted nearly at eye level, then slightly widened in middle of posterior fourth of length, moderately narrowing into broadly curved tempora. Frons moderately, vertex more convex. Surface scarcely, irregu-

larly punctured, distance between punctures less than their diameter. Squamules short, slightly longer than diameter of punctures, on sides slightly longer, thinner, pale yellowish, recumbent, tips turned downward. One-fourth longer than thorax. — Antennae stout, with coarse, pale squamules.

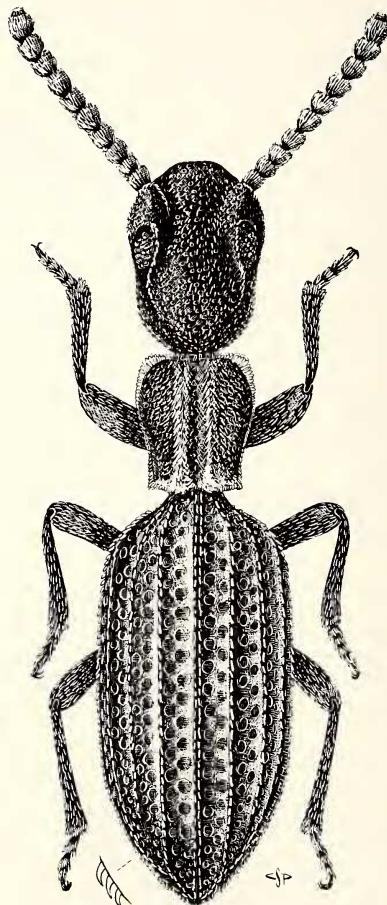


Fig. 38: *Araeoschizus mexicanus* Champion

Prothorax. — One-sixth longer than wide at the widest point; sides on frontal two-thirds moderately arcuate, posterior third slightly sinuate. Middle with two sharply elevated longitudinal ridges creating very prominent median groove which is obtuse at frontal-, open at posterior end. Surface punctuation similar to head. Margin darker, almost black, side edge with short, anterior, posterior edges with slightly longer, squamules, which are longer about anterior angles. Surface sparsely covered with short, pale colored decumbent squamules, which are slightly longer, semi-erect on ridges.

Elytra. – Slightly more than twice as long as wide, subparallel from below base to behind middle; shoulders moderately, posterior end more prominently rounded, not depressed in middle; four longitudinal ridges easily recognizable dorsally, deep interspaces with two rows of narrowly separated large punctures spaced alternate. Marginal ridge short, present only on posterior third. Scutellar ridge, like others, sharply elevated, entire ridge 2, 4 continuing from center; ridge 1 slightly longer than 3, which is fused with 2 before end of ridge 1. All ridges covered with decumbent squamules with sharply pointed ends. Interspaces without squamules.

Length: 4.0 mm.

Distribution:

Holotype: Mexico, Province Guerrero, Tepetlapa, settlement on the railroad line 25 km. NE of Iguala; 3000 ft. In the British Museum (Natural History) collection.

It is doubtless, as Champion mentioned, closely allied to *sulcicollis*, but differs greatly in the more narrowly rounded shoulders of the latter, the more broadly rounded abdomen, and in the center of the elytra is slightly depressed in *sulcicollis*. The ends of the four longitudinal ridges in *sulcicollis* is different, ridge 4 joins 3 shortly before 3 joins the very short marginal ridge, which then joins the end of the suture. The color of both species is nearly the same.

Araeoschizus regularis Horn, Figs. 16a and 39.

Horn, Trans. Amer. Ent. Soc., 14 (64), 1870:274–275; Trans. Amer. Ent. Soc., 17, 1890:340–341. – Casey, Ann. New York Acad. Sci., 5, 1890:368; Proc. Washington Acad. Sci., 9, 1907:488–489.

Somewhat resembles *simulans* Casey. Body more parallel sided, longitudinal groove of prothorax not as prominent as in *simulans*. Uniformly squamulose; shiny. Much darker brown.

Head. – Not quite as broad as long. Uniformly punctured; covered with forwardly recumbent, club-shaped pale yellow squamules. Preocular lobe well elevated, its interior margin broadly, deeply impressed, darker brown, almost black. Ocular ridge prominent, more so at eye level; squamulose. Anterior portion of ocular groove about one-third length of posterior portion; both coarsely punctured; with prominent margin posteriorly near broad occipital curvature. Occipital impression broad, shallow, not squamulose. Vertex elevated, anteriorly constricted toward lighter brown frons. Eyes relatively small, narrow, 16–17 facets dorsally, 4–5 ventrally. – Antennae barely reaching into posterior third of prothorax; joints well separated; uniformly covered with short, golden-yellow squamules. Joint 1 largest; 2 shorter than 1, longer than 3; 4–9 uniform size; 10 slightly longer than 9; 11 half size of 9, plumose.

Prothorax. – One-third longer than broad. Longitudinal groove shallow, more indicated by arrangement of squamules with nonsquamulose line at middle; slightly more impressed in posterior fourth; anterior fourth slightly convex, almost flat. Minutely punctured; surface densely, uniformly covered with squamules size, shape as on head.

Anterior, posterior margins straight; sides broader in anterior half; moderately constricted in posterior third, with row of dense, golden-yellow squamules, which are slightly longer, denser on anterior, posterior margins. Most squamules at posterior base of groove posteriorly decumbent.

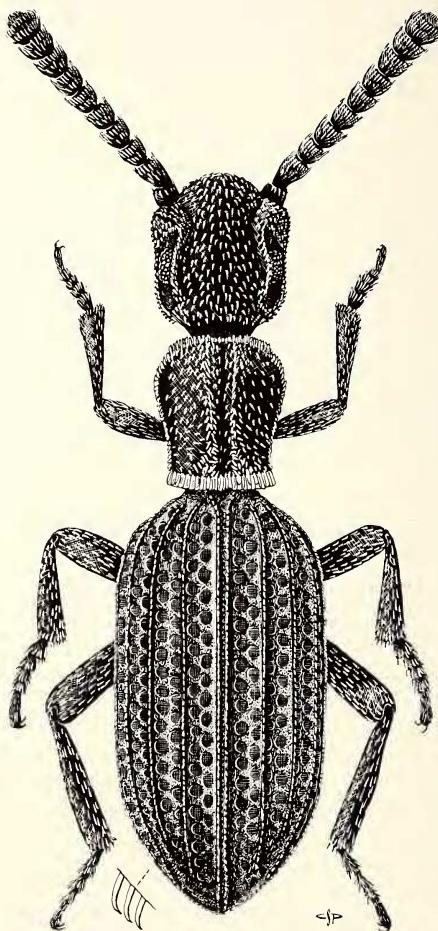


Fig. 39: *Araeoschizus regularis* Horn

Elytra. — Twice as broad as posterior margin of prothorax, narrow, two- or two-and-one-fourth longer than broad at middle; sides parallel in center half. Cordae well elevated, darker, lined with short, sharply pointed, near tip curved, posteriorly recumbent pale squamules. Sutural groove broad, deep; sutural costae elevated, with same size, density of squamular line as other cordae. All cordae entire anteriorly, posteriorly corda 3 reaches margin behind end of shorter 2, 1 longer than 2. Interspaces with two rows of prominent puncture lines.

Underside.

Head. — Coarsely punctured; except gular area, gular line, base of submentum, very sparsely squamulose. Submentum broad; process prominent, internal base deeply carinate; more squamulose. Antennal basal cavity shallow. Cavity of ventral portion of eye shallow.

Prothorax. — Less densely punctured than head; sides not squamulose. Prosternal ridge prominent, more elevated anteriorly, abruptly ending before anterior margin of prothorax; prosternal process broad, flat; squamulose.

Hind body. — Mesosternum short; epipleurum visible; sparsely punctured; only narrow mesosternal process with squamules. Metasternum with large punctures, each with decumbent squamules not longer than diameter of puncture. Abdominal segment 1 with punctures, squamules as metasternum; size decreases posteriorly; segments 4, 5 mostly squamulose; marginal row of squamules absent; edges of segment blackish, rest of underside dark brown, shiny.

Legs. — Anterior pair heaviest, posterior longest, median smallest. Evenly, densely covered with short, decumbent pale squamules. Tibial collar consists of few, very short, spine-like squamules. Tarsi sparsely squamulose.

Length: 3.7–4.2 mm.

Distribution:

From the MCZ, I received 9 specimens labeled as *regularis* Horn, from the LeConte, and from the Horn Collections.

(1) Four specimens are from the LeConte Collection: One specimen has four labels, as follows: "Ariz." then a red label "Type 7185", identification label with the same handwriting as on specimen from the Horn Collection "A. *regularis* Horn", and "J. LeConte Collection". The additional three specimens have only two labels, "Ariz." and "J. LeConte Collection".

(2) Five specimens from the Horn Collection, of which one bears the following three labels: "Ariz.", then a red label "Lectotype 3999", underneath another "A. *regularis* Horn", with same handwriting as in (1). An additional four specimens each have two labels: "Ariz.", then a blue label "Paratype 3999.2, 3999.3, 3999.4 and 3999.5" respectively.

After a close examination, specimens from the LeConte Collection (1 above, including the "Type" of *regularis*) prove to be *A. decipiens* (belongs to Group V, specimens with secondary rows of squamules). Therefore, it is obvious that the type label was placed on the wrong specimen by someone, and this mistake must be corrected. Hereby, I designate the "Lectotype" labeled specimen from the Horn Collection as a valid Lectotype, and those four "Paratypes" as Paralectotypes, which I have so labeled.

Arizona:

Navajo County: The only collection from the northern part of Arizona, in Winslow, VII. 31 (no year) by Schwarz (USNM) 1 specimen.

Graham County: Fort Grant, I. 24 (no year) by Hubbard and Schwarz (USNM) 31 specimens. Supposedly the type location (Horn 1870:275).

Pima County: Madera Canyon, II. 1975, R. Lenczy. – Santa Rita Mountains, III. 25. 1936, by Bryant (CAS) 11 specimens; IX. 10. 1936, by Bryant (CAS) 21 specimens; IX. 5. 1937, by Bryant (CAS) 8 specimens. – Stone Springs, Santa Rita Mountains, III. 23. 1969 by K. Stephan (OSUC) 1 specimen; Santa Rita Mountains, IX. 10. 1936, by Bryant (DAN) 5 specimens; III. 25. 1937 by Bryant (NDA) 35 specimens; V. 1. 1937 by Bryant (DAN) 39 specimens; Santa Rita Mountains, V. 21–VI. 22 (no year) by Hubbard and Schwarz (USNM) 2 specimens; Santa Rita Mountains, III. 17. 1937 by Bryant (CAS), and V. 1. 1937 by Bryant (CAS) 7 specimens; IV. 3. 1939, labeled “under stones with termites but no ants” by Bryant, near Arivaca, 1 specimen (DAN), IV. 3. 1937 labeled “with neither ants or termites” by Bryant, 1 specimen (CAS); 8 mi. N Vail, VIII. 30. 1962 by F. G. Werner and W. L. Nutting (UAT) 2 specimens. The following collections from Tucson: IV. (no year), by Bryant (CAS) 14 specimens; III. 15. 1937 by Bryant (CAS) 3 specimens; II. 1. 1942 by Bryant (CAS) 3 specimens; III. 5. (no year) by Hubbard and Schwarz (LAM) 1 specimen; IX. 1. (no year) by Hubbard and Schwarz (LACM) 1 specimen; (no date) by Wickham (LAM) 1 specimen; (no date) by H. Soltau (LAM) 1 specimen; IV (year?) by E. W. Munk (CUNY) 1 specimen; XII. 1. 1935 by Bryant (DAN) 3 specimens; X. 10. 1936 by Bryant (NDA) 1 specimen; I. 9.–V. 5. (no year) by Hubbard and Schwarz (USNM) 34 specimens; with no data, by Wickham (USNM) 4 specimens; with no data, by Wickham (MCZ) 8 specimens; VIII. 12. 1968 by W. Suter (OSUC) 1 specimen; under stone, X. 1966 by F. G. Werner (UAT) 2 specimens; labeled as collected “in black light trap” VI. 10.–12. 1959 by G. T. Bottger (UAT); 10 mi. E of Red Rock, under stone with ants in refuse pile, IV. 9. 1967 by F. G. Werner (UAT) 3 specimens. Sabino Canyon near Tucson, III. 16. 1953, by A. and H. Dietrich (CUNY) 1 specimen.

Pinal County: Oracle, I. 14. (no year) by Hubbard and Schwarz (USNM) 1 specimen; Superior II. 15. 1934 by Bryant (CAS) 1 specimen.

Santa Cruz County: Nogales VIII. 10.–13. (no year) by Wickham (CAS) 1 specimen; same data by Wickham (UMC) 1 specimen; same data by Wickham (USNM) 3 specimens; same data by Wickham (MCZ) 1 specimen.

Cochise County: Bisbee II. 1. 1940 by Bryant (CAS) 11 specimens; Ramsey Canyon, Huachuca Mountains V. 8. 1967 by F. G. Werner and G. D. Buttler (UAT) 2 specimens.

Maricopa County: Gila Band III. 16. 1969 by K. Stephan (OSUC) 1 specimen.

Mexico:

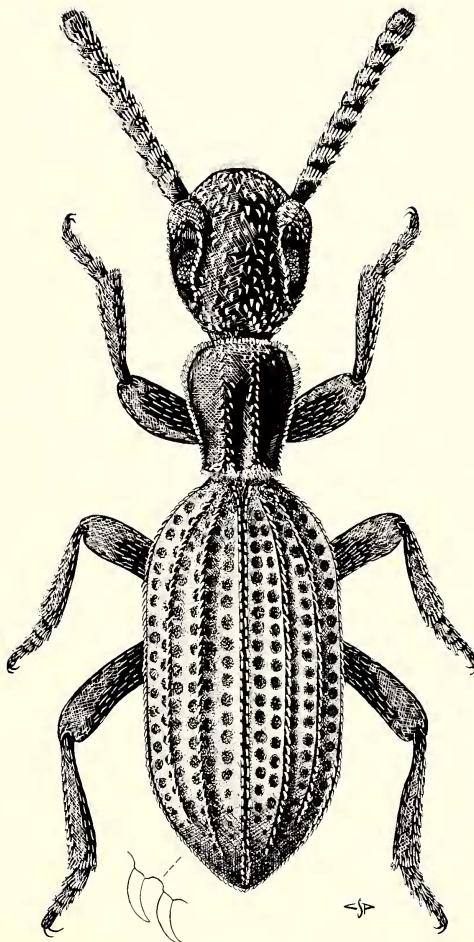
Sonora State, 44 mi. NW Caborca, March 20, 1980, under stones, in association with the ant *Iridomyrmex pruinosus analis*, 3 specimens, J. Ovyev, collector (CID).

Araeoschizus simulans Casey, Figs. 16a and 40.

Casey, Proc. Washington Acad. Sci., 9, 1907:400 (in key).

In some respects resembles *sulcicollis* Horn, to which it is closely related. However, it is much shorter, prothorax larger, legs, especially the anterior pair are more robust; hind body is much shorter in relation to head, prothorax.

Head. – Not quite one-fourth longer than broad across ocular lobes. Densely punctured, each puncture with club-shaped, forwardly decumbent pale squamule, those in frontal fourth slightly longer, denser. Ocular lobes broadly rounded, triangular, squamulose, with interior margin continuing partially at base of ocular ridge, which is covered with somewhat longer, slightly broader squamules than those on ocular lobes. Ocular

Fig. 40: *Araeoschizus simulans* Casey

groove deep, anterior portion half as long as portion posterior to eye. Margin with recumbent squamules, including shallow occipital impression. Eyes relatively small, 15 facets dorsally, 4 ventrally. — Antennae robust, joints well separated, densely squamulose. Joint 1 one-third longer than 2, ventrally squamulose; 2 one-third longer than 3; 4-9 smaller than 3; 6-11 laterally compressed; 10 twice size of 11; squamules from 6 gradually thinner; plumose on 11.

Prothorax. — Slightly shorter than head. Longitudinal groove prominent; ridges more elevated posteriorly, where they are more squamulose. Anterior portion margins straight; sides broad behind rounded anterior corner; sharply constricted in posterior fourth; posterior angle sharply pointed, slightly protruding exteriorly; hind margin two-third width of prothorax at broadest point. Edges densely, evenly squamulose; squamules slightly longer at anterior curvature. Surface granulose; with deep impression between posterior angle, base of longitudinal ridge; otherwise sparsely squamulose.

Elytra. — About one-fourth longer than head, prothorax combined. Surface at middle-half flatly impressed. Shoulders narrowly rounded; sides in middle-half parallel. Primary costae prominent; squamules dense, short, posteriorly decumbent, sharply pointed, overlapping. Interspaces relatively broad, two puncture-lines composed of flat (not deep) punctures with rounded edges. Sutural groove narrow, edges squamulose as costae.

Underside.

Head. — Coarsely, irregularly punctured, with narrow spaces dividing individual punctures. Sparsely squamulose. Sublabial plate broad, black frontal margin slightly impressed at middle; basal groove deep, broad; post genal process prominent, narrowly pointed, inner base deeply carinate; entire submentum sparsely squamulose. Gular region, line coarse, reaching anteriorly to basal groove of sublabial plate.

Prothorax. — Minutely coarse, almost smooth, with few (4-5) large prominent punctures on sides. Margins black. Prosternal ridge flatly rounded, lower anteriorly; with few decumbent broad squamules in posterior half and on broad, medially convex, prosternal process.

Hind body. — Mesosternum smooth, with few shallow punctures. Mesocoxae with 4-5 long, narrow, curved squamules ventrally. Metasternum smooth, with few scattered deep punctures each with decumbent, flat squamule; most slightly longer than diameter of punctures where they originate. Abdominal segments sparsely punctured, diameter of punctures less than distance between punctures; each puncture with decumbent squamule. Size of punctures, squamules decreasing posteriorly. Marginal row of squamules on posterior of abdominal segments distinct, denser than squamules on surface; punctures on segment 4 minute, 5 smaller than 4, flat, slightly longer than on segments 1-3.

Legs. — Front pair slightly heavier; middle pair shortest. Sparsely squamulose; squamules decumbent, broad. Tibial collar short, dense, goldish-yellow.

Length: 4.0 mm.

Distribution:

Holotype: "S. Cal", in the Casey Collection, No. 46396 (USNM).

Known only from the type specimen.

No further information as to the collection site of the only specimen is available. As the result of tremendous changes in habitats in southern California since the collection date of the only specimen (before 1907), I am tempted to regard it as an extinct species.

Araeoschizus sulcicollis Horn, Figs. 16a and 41.

Horn, Trans. Amer. Philos. Soc., 14 (64), 1870:274; Trans. Amer. Ent. Soc., 17, 1890:340, and 341. — Casey, Ann. New York Acad. Sci., 5, 1890:368; Proc. Washington Acad. Sci., 9, 1907:488. — Tanner and Packham, Sci. Bull., Biol. Series, Bringham Young Univ., 6 (1), 1965:20-21.

Resembles *simulans* Casey. Easy to separate by the proportionally larger head, smaller prothorax, and larger hind body in this species. Narrower and slightly larger. A lighter brown species.

Head. — One-fourth larger than prothorax; one-fourth longer than broad at broadest point. Sharply, roundedly narrower posteriorly; broadly, flatly rounded anteriorly. Preocular angle rounded; ocular lobes well elevated, broadly rounded, with deeply impressed interior margin. Ocular groove deep, posterior portion about twice as long as anterior; shiny. Surface with deep, closely placed punctures, some with forwardly recumbent, club-shaped, pale squamules. Broad occipital impression not squamulose. Vertex sharply concave, highest between posterior ends of ocular ridge, which is narrow; edge moderately densely squamulose. Slight impression between frons, vertex about between posterior portion of ocular ridge. Eyes small, 19 facets dorsally, 5 ventrally. — **Antennae** not reaching to middle of prothorax (or nearly so). Joints well separated; 3 slightly longer than 1 or 2; 2-9 of uniform size; 10 half again as long as 9; 11 less than half 10; 6-11 slightly compressed dorsally; squamulose; squamules gradually thinner towards end; 11 finely plumose.

Prothorax. — One-fourth longer than broad at anterior half; one-fourth shorter than head. Longitudinal groove deep; slightly shallower at posterior fourth; longitudinal ridges prominent, sides with upwardly projecting pale squamules. Surface densely covered with deep punctures, some between ridges, margin (especially in anterior, broader half) with inwardly projecting squamules. Anterior, posterior margins straight; anterior angle narrowly rounded, gradually narrowing posteriorly, sharply constricted before sharp posterior angle. Surface of sides behind middle (between margins, longitudinal ridges) deeply impressed. Edges squamulose throughout.

Elytra. — One-fourth longer than head, prothorax combined; mid-surface flat. Shoulders narrow, sides parallel, narrowly, pointedly rounded posteriorly. Costae, especially 2, 3, well elevated, each with row of posteriorly decumbent, curved, pointed, short squamules. Puncture lines dense between, punctures closely placed, gradually smaller posteriorly.

Underside.

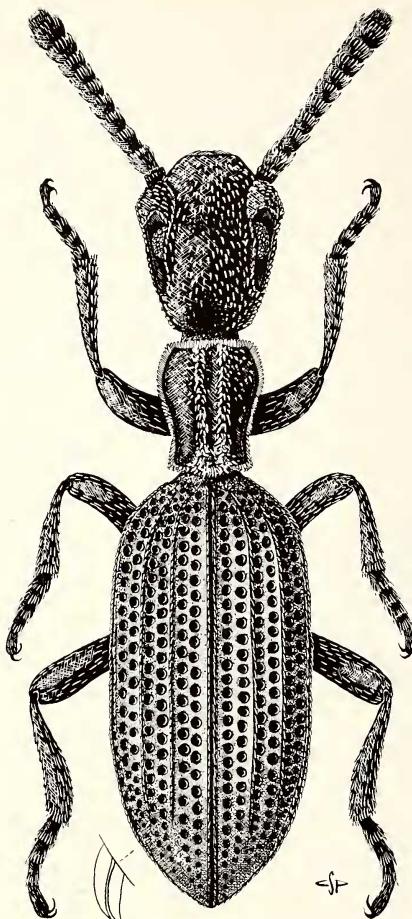


Fig. 41: *Araeoschizus sulcicollis* Horn

Head. – Surface between longish, sharp-edged punctures smooth, with few, forwardly decumbent narrow squamules. Submentum broad, edge straight at middle, with 4–6 broad, forwardly decumbent squamules; post genal process sharp, prominent, inner base sharply carinate, surface squamulose. Mentum rounded anteriorly, about as broad as long; surface with outwardly radiating long, hair-like, sharply pointed, curved squamules. Gula smooth, broad, short anteriorly. Broad groove of submentum triangularly, flatly reaching posteriorly about middle of strongly concave central post-genal area.

Prothorax. – Surface smoother than head; punctures well defined, separated by more than puncture diameter. Edge of prosternal process, which is roundedly constricted at middle, squamulose. Prosternal ridge flatly rounded, almost absent.

Hind body. – Surface smooth between small, sparsely spaced punctures; punctures gradually smaller posteriorly; each with narrow, posteriorly decumbent squamules,

which is shorter than diameter of puncture on marginal areas, slightly longer in punctures medially. Squamules thin, flat, somewhat longer on terminal segment of abdomen.

Legs. — Median pair smallest, posterior largest; not robust. Surface squamulose, dorsal edge of tibiae with rows of heavier, apically broader, pale squamules.

Length: 3.6–4.0 mm.

Distribution:

Holotype: "Cal", No. 8001 in MCZ. (One specimen from the LeConte Collection labeled as Holotype "Cal, No. 7186" will be regarded as another species.)

Paratypes: "Cal", No. 8001.2, 8001.3, 8001.4 in MCZ.

In the type series from the MCZ, I received 11 specimens, including the above mentioned type material. Two specimens from the LeConte Collection with identical labels as on the type and "lectotype": "Cal". Four additional specimens with two locality labels: (1) "Cal", which is identical to all others, and (2) beneath that "Owens Valley". An additional label with the note "Horn Coll. H 7230". — Horn notes (1870:274) "Collected in Owens' Valley, California, under stones in very dry places, and very frequently, probably merrily accidentally, with ants. Very abundant during Spring and Summer".

California. — Kern County: Short Canyon, 7 mi. NW Inyokern, IV. 17. 1955 (no collector recorded on specimen), (UCB) 1 specimen.

Inyo County: Owens Valley, Keeler, VI. (no exact date or collector's name on specimen), (MCZ) 1 specimen; Bishop (no data), A. Fenyes (CAS) 1 specimen; Tinemaha Dunes, III. 17.–VIII. 22. 1979, D. Giuliani (CDFA) 3 specimens; Shepherd Creek, near Manzanar, IV. 23. 1955, C. Hogue (LACM) 4 specimens; Saline Valley, Grapevine Canyon Rd., Station 28, V. 16. 1959, by Banta (CAS) 2 specimens; Townes Pass, IV. 28. 1975 (7 specimens), IX. 15. 1975 (57 specimens) and IX. 20. 1974 (18 specimens), all handpicked from under stones by F. G. Andrews and A. R. Hardy (CDFA) 82 specimens; the same location, IX. 20. 1974, J. T. Doyen (UCB) 50 specimens; Saline Valley, Grapevine Canyon, the following collections in various altitudes: specimens collected in ethylene glycol pit traps between IV. 20. 1978 and VI. 21. 1978: 2200 ft. 5 specimens, 2500 ft. 4 specimens, 2700 ft. 13 specimens, 3000 ft. 14 specimens, 3400 ft. 17 specimens, 3800 ft. 47 specimens, 4000 ft. 17 specimens, collected by D. Giuliani (CDFA) total of 107 specimens. Eureka Valley, an extensively collected area (see Andrews, Hardy and Giuliani, 1979) with several collection sites (antifreeze pit traps) between XI.–XII. 1977, and II.–XI. 1978; more than 50 specimens collected on the following dates: IV. 1978, V. 1978, and VI. 1978 (CDFA) a total of 740 specimens, collected by F. G. Andrews, A. R. Hardy and D. Giuliani. Inyo Co. (no other information) IV. 14. 1930 collected by Nunenmacher (FM) 1 specimen.

Nevada. — Nye County: Tonopah VI. 10. 1937, I. La Rivers (DAN) 1 specimen. Rock Valley VIII. 29. 1964, E. F. Dailey (UCB) 7 specimens. Rock Valley, in can trap, 1 specimen each date, III. 13. 1971, IV. 23. 1971, and IV. 27. 1971, D. Thomas (CSULB) 3 specimens. Mercury (Test Site, United States Atomic Energy Commission), VI. 29. 1961, VII. 15. 1961, VIII. 23. 1961, IX. 19. 1961, and X. 10. 1961, V. Tanner (USNM) 168 spe-

cimens; V. 19. 1960, VI. 9. 1960, VII. 9. 1960, X. 10. 1960, and XI. 3. 1960 (DAN) 97 specimens; Mercury, VI. 30. 1962 (2 specimens), VII. 4. 1962 (3 specimens) and VII. 11. 1962 (1 specimen) in the nest of the ant *Pheidole bicarinata*, A. C. Cole (LACM) 5 specimens. Mercury, VI. 15. 1961, no name of collector recorded (LACM) 4 specimens.

On the basis of the Atomic Test Site (Mercury) information we are able to associate *Araeoschizus sulcicollis* with certain biotypes characterized by plant associations (Allard et al., 1963, Tanner 1965). It has been observed that *sulcicollis* is present on terrain with the following plant associations: (1) *Larrea divaricata* and *Franseria dumosa*; (2) *Grayia spinosa* and *Lycium andersonii*; (3) *Coleogyne ramosissima*, and (4) a mixed plant association.

The seasonal appearance of *sulcicollis* in the above mentioned (1-4) associations may be summarized as follows:

In (1) single specimens appeared in mid-March, increasing April to mid-June. A population explosion in mid-August, then tapering down to April-mid-July average. From the end of November to mid-March there were no specimens collected.

In (2) single specimens from December to mid-March; with rapidly rising numbers, and a population explosion about mid-April. Then tapering to a minimum population size from mid-May to the end of July, with fewer specimens noted in about August. A second population explosion was noted in mid-September, which again tapered off to single individuals by the end of October.

In (3) individuals only in January. Mid-March more specimens until about the end of April, then this number slowly drops until the end of July. A population explosion occurs about mid-September, then slowly tapers off and disappears from mid-November to mid-January.

In (4) scattered specimens found year around. More individuals from April to July, and during September.

From the above associations (2) produced the most specimens, then in order (1), (3), and (4).

A. sulcicollis disjunctus Papp, new subspecies.

An isolated population West of the Sierra Nevada, on the West side of the San Joaquin Valley, was discovered in recent years. After some deliberation, I would like to regard those temporarily as a subspecies to *sulcicollis*. The major differences may be summarized as follows:

Much larger, 4.1-5.0 mm.

More squamulose, especially the ventral side, where abdominal segment 4, 5 are densely squamulose; punctures large, irregular in shape, closely placed; squamules as broad as long, sometimes longer than diameters of punctures, decumbent. Antennae more robust, joints rounded and very densely squamulose. Generally, they are darker.

Holotype: California, Kings County, 1 mi. SW. Kettleman City, January 3, 1979 – June 8, 1979, ethylene glycol pit trap, F. G. Andrews and A. R. Hardy, collectors (CAS).

Paratypes: 68 paratypes with same data, distributed as follows: CAS 4 specimens; 2 of each in the collections of AMNH, USNM, LACM, BMNH, SAS, and the Magyar Nemzeti Muzeum, Budapest (through Dr. Z. Kaszab). Remainder in the CDFA Collection.

Additional specimens:

San Benito County: 33 mi. SE Paicines, in the nest of the ant *Pheidole hyatti*, VI. 9. 1971, R. Snelling (LAM) 1 specimen; on the county line, Big Panoche Creek, IV. 21. 1967, J. T. Doyen (UCB) 24 specimens (see also under Fresno County).

Fresno County: Panoche Canyon, 700 ft., 25 mi. SW Mendota, in colony of the ant *Pheidole barbata*, III. 24. 1975, R. Snelling (LACM) one specimen; 10 mi. E. Avenol, III. 22. 1968, J. T. Doyen (UCB) 1 specimen; Panoche Creek Base Camp, VIII. 15. 1960, J. S. Applegarth (CAS) 1 specimen; Big Panoche Creek, San Benito County line, IV. 21. 1967, J. T. Doyen (UCB) 8 specimens; Jacalitos Canyon, 5 mi. S. Coalinga, VII. 16. 1974, J. T. Doyen (UCB) 2 specimens; same J. T. Doyen and P. A. Opler, in nest of *Pogonomyrmex* ant (UCB) 1 specimen; Ciervo Hills, 18 mi. SW Mendota, VII. 18. 1975, in pitfall trap, J. T. Doyen (UCB) 3 specimen.

Key to the species of Group V.

- 1 Head as broad as long, angularly rounded posteriorly 2
- Head longer than broad, broadly rounded posteriorly 3
- 2 Prothorax as broad as head 4
- Prothorax narrower as head 5
- 3 Shoulders broadly rounded. Length of posterior margin of prothorax is half of the width of elytra at middle. Elytra parallel sided. Squamules short, sharply pointed, posteriorly recumbent. Length: 3.9–4.1 mm. (Chihuahua Prov., Mexico) *microcephalus* n. sp.
- Shoulders angularly, pointedly rounded. Length of posterior margin of prothorax less than half of the width of elytra at middle. Elytra not parallel sided, broader in posterior half. Squamules short, sharply pointed, decumbent. Length: 3.8–4.0 mm. (SE Arizona, S New Mexico, SW Texas; N Sonora, Mexico?). *decipliens* Horn
- 4 Surface of prothorax at center near posterior margin impressed. Head, prothorax evenly covered with short, club-shaped, decumbent squamules. Two shallow tufts at posterior margin of prothorax present; margin densely squamulose. Sides of elytra not parallel; primary and secondary cordae about evenly prominent with row of decumbent squamules of same size. Length: 4.0–4.2 mm. (central Apache and Navajo Counties, Arizona) *apachensis* n. sp.

- Surface of prothorax near posterior margin of prothorax flat; sides very slightly constricted before posterior angle; anterior angle sharply rounded 6
- 5 Head parallel-sided, same in width as prothorax; both densely covered with short, club-shaped, decumbent squamules. Posterior fourth of prothorax sharply impressed dorsally, this depression anteriorly became broadly flat; posterior fourth slightly constricted. Secondary cordae less prominent. Length: 3.9–4.1 mm. (Sierra Co., New Mexico.) *similaris* n. sp.
- Head not parallel-sided, with narrowly, pointedly rounded occipital curvature. Prothorax narrower as head, very slightly constricted before posterior angle; sides with row of squamules; anterior, posterior edges with row of dense squamules. Surface of head, prothorax sparsely covered with erect to suberect thin squamules. Secondary cordae of elytra almost flat; cordae with row of erect to suberect, long, sharply pointed squamules. Length: 2.9 mm. (S California) *exiguus* Casey
- 6 Elytra parallel sided; twice as wide ad middle as long prothorax is. Shoulder narrowly rounded. Secondary cordae flat; squamules on cordae short, erect, straight, sharply pointed. Length: 3.7–3.9 mm. (S California, S Arizona; probably near south of the border.) *costipennis* LeC.
- Elytra parallel sided, one-and-a-half times broader than prothorax is long. Shoulder broad. Secondary cordae slightly elevated; all cordae with decumbent, parallel-sided, near end sharply pointed, slightly curved, decumbent squamules 7
- 7 Head nearly as wide or slightly narrower than prothorax; densely squamulose. Prothorax with impression at middle before densely squamulose posterior margin; center area in place of longitudinal groove broadly flat anteriorly; surface as squamulose as head, margins more densely so. Length: 4.0–4.2 mm. (Extreme SE Utah.) *utahensis* n. sp.
- Head as wide or wider than the narrow prothorax; occipital area broadly rounded. Posterior third of prothorax slightly constricted, almost parallel-sided; anterior, posterior margin densely squamulose. No impression at base of prothorax 8
- 8a Shoulder very narrow, flatly rounded, sides parallel. Secondary cordae flat, sparsely squamulose; primary cordae distinctly elevated and each with a row of short, erect to semierect sharply pointed straight squamules. Length: 3.2–3.5 mm. (Tucson and vicinity, Arizona) *tenuis* Casey
- Shoulder narrow, more angularly rounded; sides not quite parallel. Secondary cordae slightly, primary more so elevated, with slightly curved, sharply pointed, long, bristle-like squamules. Head broader than prothorax; sides of latter straightly narrowing posteriorly. Length: 4.0 mm. (Central eastern Utah) *setosiformis* n. sp.

8b Shiny; minutely, sparsely squamulose, form and shape resembles *simplex* (Group VI.), but here the secondary row of squamules present, with squamules much shorter and more sparsely spaced than in the primaries; squamules on primary cordae are suberect, curved (straight in *simplex*), gradually narrowing toward end, where pointed. Length: 4.1–4.2 mm. (NE Riverside County, California.) *doyenii* n. sp.

***Araeoschizus apachensis* Papp, new species, Figs. 16a and 42.**

Resembles *decipiens* Horn. Easily separated, since in this species the head and prothorax are about as long as broad (in *decipiens* they are longer than broad), and the head is slightly smaller than the prothorax. Elytra not impressed medially, uniformly rounded on top. Dark brown, cuticle shiny; very minutely squamulose.

Head. – As long or slightly longer, but always narrower than prothorax. Sides nearly parallel; frontal margin rounded, somewhat flat at middle, with sharp preocular angle. Occipital angles abruptly rounded, impression at middle minimal. Ocular lobes moderately elevated, angles rounded; sides anterior to eye slightly compressed; interior margin shallow; ocular short, sharply S-shaped. Anterior portion of ocular groove steep; posterior slightly longer; both deep, smooth, shiny, not squamulose. Surface with large, flat, sharp-edged punctures, prominent on vertex, less so on frons; each puncture with short, forwardly recumbent club-shaped, at base very narrow, pale squamule, squamules slightly narrower, larger on frons, hair-like on frontal margin. Edge, ocular lobes, ocular ridge with slightly shorter, broader squamules. Eyes small, deeply set, with 15–16 facets dorsally, 5 laterally. – Antennae slender, dorsally compressed. Joints well separated; 1 longest, 2 longer than 3 but shorter than 1; 3 smaller than 3, slightly longer than 5; 5–9 about even size; 10 as long as 2, slightly broader; 11 size of 9, slightly narrower. Joint 1–3 with narrow, longer squamules than frons; squamules gradually become narrower on 4–5, narrower yet on 6, 7; hair-like on 8–10; 11 with pumose tip, with very thin, hair-like squamules laterally.

Prothorax. – About as long as wide, slightly shorter, broader than head. Anterior, posterior margins nearly straight, latter deeply impressed medially; sides behind rounded anterior angle broadly rounded, gradually converging behind middle with minimum constriction before posterior angle. Surface smooth, shiny, between elongated, deep, sharp-edged punctures; anterior middle flat, posterior convex. Densely squamulose; squamules longer on anterior margin, same size, denser in multi-row arrangement on posterior. Indication of squamous pit at middle of posterior margin.

Elytra. – One-fourth longer than head, prothorax combined. Longitudinal costae dominant, secondaries not reaching anterior base of elytra, only slightly shallower than primaries; row of squamules slightly smaller than on primaries. Shoulders broader than posterior of prothorax; sides not parallel; pointedly narrowing posteriorly. Squamules narrow, posteriorly recumbent, curved, sharply pointed, barely touching on marginal

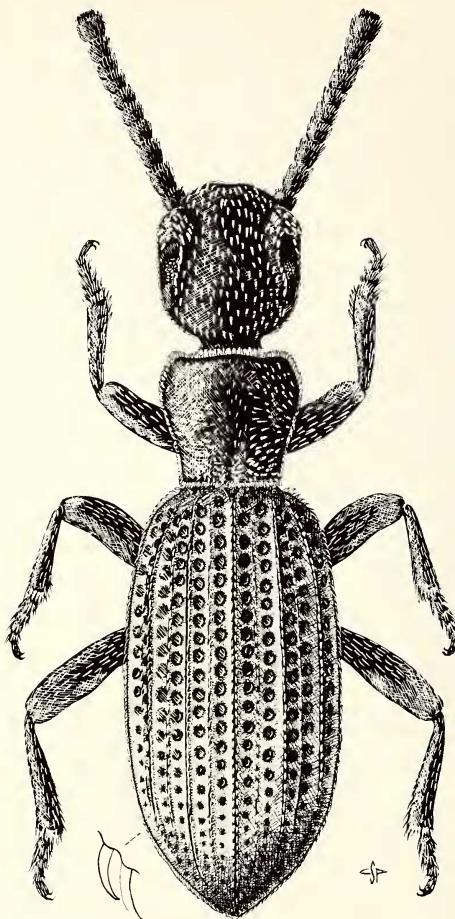


Fig. 42: *Araeoschizus apachensis* Papp, n. sp.

costae. Puncture lines prominent; size smaller in posterior fourth; edges sharp; closely spaced in anterior half; distance between punctures gradually larger posteriorly; size minute in apical area.

Underside

Head. — Minutely, densely punctured. Labial palpus small, pale-brown. Maxillary palpus relatively robust, much darker than galea. Submentum sharp, narrow, blackish; process large, broad, almost black; squamulose; distance between proboscis not quite half width of head, inner base of proboscis deeply carinate. Mentus narrowly rounded anteriorly, as long as broad, with outwardly radiating squamules of about same size as on basal joint of antennae; center bald. Gula flat, bald; gular line continuing into broad, deep basal groove of submentum. Surface sparsely covered with short, narrow, forwardly decumbent squamules throughout except hourglass-shaped center portion.

Prothorax. – Minutely, sparsely punctured, distance between punctures 1 to 2 times diameter of punctures; shiny. Broad, well elevated prosternal ridge ending before anterior margin, densely squamulose; sides pointedly rounded. Margins black.

Hind body. – Mesosternum short, not squamulose; minutely, sparsely punctured. Metasternum with well defined, elongated punctures, each puncture with narrow, decumbent squamule, not longer than longer diameter of puncture. Abdominal segments punctured; segment 1 similar to metasternum with longer, narrower squamules; 2–5 size, density of elongated punctures decreasing posteriorly; on 4, 5 smallest, while length of squamules increasing; squamules on 4, 5 hairlike, dense, much longer than diameter of punctures.

Legs. – Robust; anterior pair short, posterior longest; densely covered with narrow, long, decumbent squamules. Tibial collar of sparsely spaced, short, spine-like squamules, on dorsal side slightly longer, hardly detectable. Tarsi with spine-like squamules.

Length: 4.0–4.2 mm.

Distribution:

Holotype: Arizona, Apache County, Sanders, June 27, 1973, W. Spitzer collector. In CAS.

Paratypes: 24 specimens with same data. Two in CAS, 6 in CDFA, 2 in USNM, 2 in MBNH, and 2 in AMNH. Ten specimens returned to UAT.

Additional specimens: 2 in UAT from Arizona, Navajo County, Holbrook, May 26, 1961, F. H. Parker collector.

***Araeoschizus costipennis* LeConte, Figs. 16a and 43.**

LeConte, Ann. Lyc. New York, 5, 1851:138; Arcana Nat., 1859:124, t. 13, f. 11. – Lacordaire, Genera Coleopt., 5, 1859, t. 49, f. 4. – Horn, Trans. Amer. Philos. Soc., 14 (64), 1870:275. – Champion, Biol. Centr.-Amer., Col. 4 (1), 1884:51. – Horn, Trans. Amer. Ent. Soc., 17, 1890:324. – Casey, Ann. New York. Acad. Sci., 5, 1890:368; Proc. Washington Acad. Sci., 9, 1907:486.

This is the type species of the genus *Araeoschizus* LeConte. A slender species, with prominent longitudinal primary costae on elytra, with sharp-edged, deep puncture lines in interspaces; sharply pointed, straight, spine-like squamules on ridges as long or slightly longer than diameter of punctures. Costae parallel, with very short anterior curvature in humeral area. Dark brown.

Head. – Slightly longer, broader than prothorax. Densely punctured with shallow punctures. Throughout squamulose. Preocular angle present, however short; frontal margin rounded, flatish medially. Frons prominent, elevated, due to deep, relatively broad interior margin of prominent ocular lobes. Ocular ridge short, elevated on posterior half, sharply curved. Sides almost parallel, slightly compressed below eye level; occipital angle moderately broadly rounded (appearing more sharply rounded due to extensive coverage of somewhat longer, erect, club-shaped squamules); occipital impression

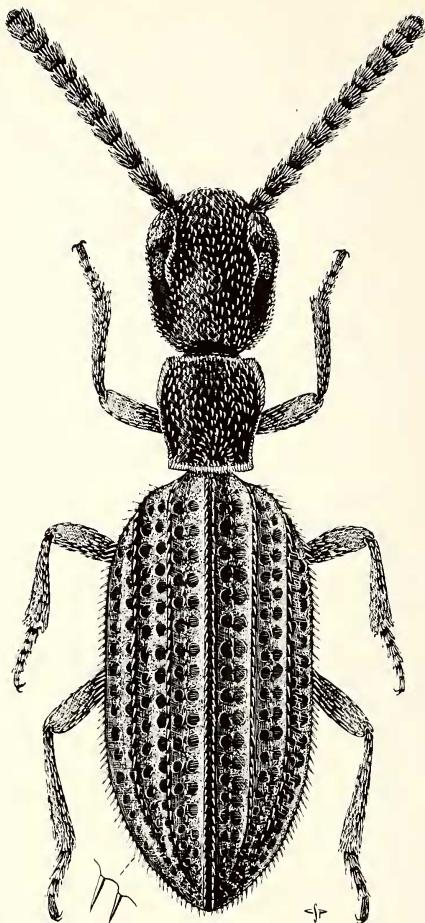


Fig. 43: *Araeoschizus costipennis* LeConte

shallow, hardly present. Posterior half of vertex higher than anterior. Surface densely covered with forwardly decumbent, nearly parallel-sided, pointed, pale yellow squamules; those on occipital angle, on ocular ridge, anterior portion of frons slightly heavier. Eyes relatively small, slightly longer than length of anterior portion of smooth ocular groove; with 16 facets dorsally, 5 ventrally. — Antennae densely squamulose, individual joints visibly separated. Joint 1 slightly longer, broader than 2; 3 shorter than 2; 4-9 about same size; 10 slightly longer than 9; 11 about half size of 10. Squamules narrower, longer than on head; gradually narrower towards terminal joint, almost hair-like on 11, which has plumose, pale yellow tip.

Prothorax. — Slightly shorter, narrower than head. Margins with thinner, surface with broader squamules, those on anterior, posterior margins golden-yellow, other pale yellow. Surface deeply punctured, each puncture with more or less parallel sided squa-

mule with rounded tip, about twice as long as diameter of puncture. Squamules on sides longer than on surface, erect, club-shaped. Surface medially behind anterior margin slightly flattened; that before posterior margin impressed, with squamules radiating outward from roundish impression. Sides broad in anterior half; moderately constricted before posterior pronotal angle.

Elytra. — About three-and-one-half times longer than prothorax. Primary costae prominent, secondaries absent. Sides in middle half parallel, shoulder narrow. Puncture lines in interspaces prominent, distance between punctures about size of diameter of puncture. Primary costae with posteriorly leaning, straight, basally broader, sharply pointed squamules of same size as those on sutural costae, secondaries. Secondary row of squamules more sparsely spaced, squamular lines not entire. Size of punctures, length of squamules, slightly decreasing towards posterior of elytra.

Underside.

Head. — Sublabial plate broad; frontal margin almost straight, sharply carinated at interior base of prominent, relatively long proboscis; basal groove deep, broad, half-bowl shaped; gular area not impressed, bald; rest of underside with short forwardly decumbent, club-shaped squamules, those on sides slightly broader, less decumbent. Surface with larger sharp-edged punctures.

Prothorax. — Sparsely punctured, area between punctures smooth, shiny. Not squamulose, except surface of narrow, between coxae sharply constricted pronotal process.

Hind body. — Mesosternum short, sparsely covered with small, deep punctures; mesosternal process narrow, sides with one row (4-5) decumbent, short squamules. Metasternum with much larger punctures; a short squamule (not longer than diameter of puncture) present. Punctures gradually smaller posteriorly; each puncture with short squamule, some same length as diameter of puncture; near sides slightly longer; marginal row of squamules on blackish posterior margin of each abdominal segment slightly noticeable. Squamules denser on segment 5, especially on its marginal regions, more so on tip of segment.

Legs. — Slender, nearly even in size (anterior slightly smaller), minutely finely punctured, punctures with narrow, longish squamules, as long as those on tip of fifth abdominal segment. Exterior edge of tibiae with 2-3 rows of posteriorly decumbent, somewhat broader, club-shaped squamules. Squamular collar of tibia present, composed of short, thin, goldish-yellow, spine-like squamules. Tarsi uniformly squamulose.

Length: 3.9-4.1 mm.

Distribution:

Holotype: "Cal.", No. 4510 in MCZ. LeConte added to his identification label the word "Valec.". Described from a single specimen, unless LeConte used the other specimen labeled "Cal." in his collection, which was damaged.

Additional distributional data:

California. — San Diego County: Torrey Pines IV. 7. 1919 by Blaisdell (CAS) 1 specimen; La Puerta I. 15. 1928 by (not given), 2 specimens; X. 25 (year?) by (not given) 1 specimen; Mason Valley, I. 15. 1924 by G. H. Field 3 specimens, same dat “in cow chip” by C. C. Searl (SDMNH) 2 specimens; Scissors Crossing, 6 mi. S Banner, IX. 2. 1966 “vegetation *Haplopappus venetus vernonioides*” by J. Powell (UCB) 4 specimens, and same location, same data, by J. Powell and P. A. Rode (UCB) 2 specimens.

Riverside County: Palm Springs IV (year?) by A. Fenyes (CAS) 4 specimens; IV. 2. 1917 by E. Van Dyke (CAS); specimen; IV. 14. 1919 by (not given) (UMC) 1 specimen; (with no collection data) by Schaeffer (CUNY) 1 specimen. — Whitewater IX. 16. 1887 by W. G. Wright (CAS) 30 specimens, (CDFA) 1 specimen.

Imperial County: El Centro I. 28. 1910 by E. Van Dyke (CAS) 1 specimen; Indio V. 5. 1942 by Ira La Rivers (DAN) 6 specimens.

***Araeoschizus decipiens* Horn, Figs. 16a and 44.**

Horn, Trans. Amer. Ent. Soc., 17, 1890:342–343. — Champion, Biol. Centr.-Amer., Col. 4 (1), 1892:490–491. — Casey, Proc. Washington Acad. Sci., 9, 1907:489–490.
costipennis Champion (not LeConte), Biol. Centr.-Amer., Col. 4 (1), 1884:51; *ibid.* 1892:490.

Robust, broad. Densely covered with short, broad squamules on the head and prothorax; elytral costae with very short, posteriorly decumbent, pointed squamules. The puncture lines are dense, primary costae very prominent, secondaries less so. A somewhat lighter brown species.

Head. — Short, broad, not quite one-fourth as long as wide. Ocular lobes exteriorly not prominently protruding; sides of head slightly constricted about eye level; broad, or slightly broader than at ocular lobes behind eyes, not as broad as anterior half of prothorax. Surface densely punctured; except ocular grooves, and prominent interior margin of ocular groove, uniformly covered with short, forwardly decumbent, club-shaped pale yellow squamules. Ocular ridge high, curved, barely reaching middle of posterior portion of ocular groove. Occipital impression narrow, short. Vertex, frons evenly concave. Eyes with 15–16 facets dorsally, 5–6 ventrally. — Antennae relatively thick, joints broadly rounded. Joint 1 longest, about half again as long as 3; 2 longer than 3, shorter than 1; 4–9 even in size; 10 broader; 11 one-third of 10. Sparsely covered with longer, thicker squamules; squamules apically gradually thinner, about hair-like on 11, which has plumose, pale tip.

Prothorax. — Slightly larger, broader than head; finely punctured; evenly covered with uniform squamules (as head); squamules near posterior margin arranged into two rosette-like upwardly projecting groups separated by deep impression at middle. Center of surface flat, anterior third slightly impressed. Margin broad, anterior, posterior with multirow of golden squamules; sides with single row of dense, erect, paler squamules. Sides at anterior half broadly rounded, in posterior moderately constricted where pronotal angle prominent.

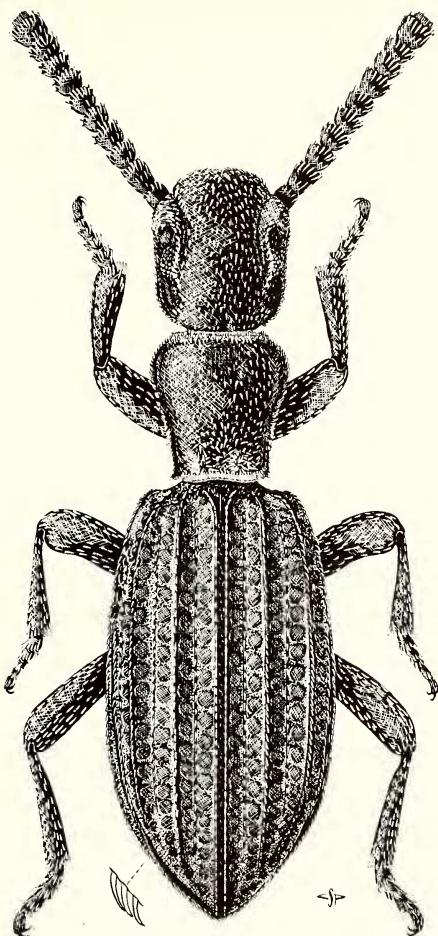


Fig. 44: *Araeoschizus decipiens* Horn

Elytra. — About one-third longer than head, prothorax combined. Sides not parallel; broadest posteriorly. Shoulders broader than prothorax. Primary cordae prominent; secondaries slightly so; cordae with short, posteriorly decumbent, closely spaced, pointed squamules. Primary cordae not joining anteriorly; secondaries shorter; third shortest. Punctures deep edges rounded; distance between less than diameter. Sutural groove wide, almost as wide as diameter of puncture; surface uneven, minutely punctured; edges with squamular lines, squamules decumbent, barely reaching each other.

Underside.

Head. — Surface densely punctured with various size of punctures; some with forwardly decumbent, club-shaped squamules, those near middle slightly longer. Gular area smooth, broad, barely connected with deep, broad, long basal groove of submentum. Post genal process plate prominent, inner side almost perpendicular to broad, almost

straight margin of submentum; interior base slightly carinate; nearly black. Mentum large, long, broad; evenly rounded anteriorly; sparsely squamulose.

Prothorax. – Sparsely punctured; punctures small, area between minutely punctured, bald, except narrow mesosternal process. Metasternum with somewhat larger punctures, some with posteriorly decumbent, thin squamules, shorter than diameter of puncture. Abdomen sparsely covered with larger, elongated punctures; each puncture with squamule on segment 1, 2; squamules not longer than longer diameter of punctures; on segment 3–5 squamules longer, more or less orderly arranged. Marginal row of squamules on posterior margin of segment 2, 3, 4 present, sparse. Squamules denser at exterior margin of terminal segment.

Legs. – Nearly uniform in size; posterior pair slightly more slender. Densely squamulose; sides of femur, tibia with narrow, longer, decumbent squamules, with thicker, somewhat recumbent squamules at edge. Tibial collar present; squamules sharply pointed, somewhat longer on interior portion.

Length: 3.9–4.2 mm.

Distribution:

Holotype: "Ariz.", No. 8002, in MCZ (labeled as Lectotype).

Paratypes: "Ariz.", No. 8002.2, 8002.3, 8002.4 and 8002.5, in MCZ (labeled as paralectotypes).

Received 4 specimens from MCZ as type (no. 7185) of *A. regularis* Horn and 3 additional specimens with the same locality labels, all from the LeConte Collection. This "Type" must be a mislabeled specimen, since all four are identical to Horn's Type of *decipliens*.

Utah: Kane Co., N slope Cedar Mtn., 5 km W Glen Canyon City; Brigham Flat (Allred and Tanner, 1979:92).

Arizona: San Pedro River near Fairbank, I. 5. 1973 by Scott McCleve, 2 specimens, 5 mi. W Double Adobe III. 26. 1970 with ants, by S. McCleve, 11 specimens, XI. 27. 1974 by S. McCleve, 1 specimen (all 14 specimens are in the McCleve collection, private); 1.5 mi. NE Portal on San Simon Road, 4800 ft. elevation VI. 9. 1971 by K. W. Brown (in the Kirby W. Brown Collection, private); Galiuro Mtn. V. 23 (year?) by Hubbard and Schwarz (USNM) 1 specimen; Huachuca Mtn. XI. 11. 1910 by W. M. Wheeler (CUNY) 1 specimen; Tucson III. 5 (year?) by Hubbard and Schwarz (USNM) 2 specimens, I. 14 (year?) by Hubbard and Schwarz (USNM) 7 specimens; Fort Grant (no data of day and collector) (CUNY) 3 specimens, VII. 24 (year?) by Hubbard and Schwarz (USNM) 4 specimens, X. 7 (year?) by Hubbard and Schwarz (USNM) 4 specimens; San Carlos Lake IX. 1930 by Duncan (UAE) 1 specimen; Winslow (no date, no collector) (MCZ) 1 specimen. Additional specimens with no specific information: "Ari." from the Liebeck collection (MCZ) 4 specimens, "Ariz. Wickh." (probably collected by Wickham) from the Frederick Blanchard Collection (MCZ) 1 specimen, "Ariz." (no other information) (CUNY) 3 specimens. – Coconino Co., S Page (Allred and Tanner, 1979:92).

New Mexico: Stelns VII. 14. 1917 by the Cornell University Expedition (CUNY) 1 specimen; 10 mi. E Deming, VII. 12. 1917 (by?) (CUNY) 1 specimen (probably by the same expedition); 3 mi. N Las Cruces IV. 24. 1975 by W. A. Iselin (DC) and 8 mi. NE Las Cruces VI. 25. 1964 by D. R. Smith and C. W. Baker (OSU) 1 specimen; Las Cruces (no other information) (USNM) 1 specimen; Albuquerque IX. (no other information) (USNM) 1 specimen; Willard IX. (no other information) (USNM) 1 specimen; White Sands VIII. 21. 1962. An additional specimen found (MCZ) from the Frederick Blanchard Collection from Deming (no collection data) collected by H. C. Fall.

Texas: 8 mi. E El Paso VI. 24. 1964 by D. R. Smith and C. W. Baker (at dusk, as noted) (OSU) 5 specimens; 3 mi. NW Valentine, Jeff Davis County V. 25. 1964 ex dead rabbit by D. R. Smith and C. W. Baker; 18 mi. SW of Seminole, Gaines County, in pitfall trap, weevil project Tex. Techn CKTP2 by C. W. O'Brian (in the collection of Kirby W. Brown, private); 5.5 mi. N Pine Springs, Culberson County IV. 10. 1974 (by?) (USNM) 2 specimens.

Colorado: Denver X. 19 (year?), by Hubbard and Schwarz (USNM) 2 specimens.

Mexico: Northern Sonora, collected by Morrison (3 specimens, which I have seen), and Villa Lerdo, Durango (collected by Hoge). (BMNH.) The specimen from Durango most likely is not *decipiens* Horn.

***Araeoschizus doyeni* Papp, new species, Figs. 16a and 45.**

A dark to medium brown, shiny species; with his coarsely punctured surface, golden-yellow, broad squamular margin of prothorax, and very short pale squamules on rest of body it is easily differentiated. A larger species, resembles *simplex*.

Head. — Slightly longer than broad; sides almost parallel, with slight indentation behind ocular lobe at level of anterior end of eye. Surface coarsely, densely punctured, sparsely covered with pale yellow, anteriorly recumbent club-shaped squamules, those toward frons slightly longer, narrower, spine-like on frontal margin; erect, denser on sides of head. Ocular lobe broadly rounded, middle of surface elevated; with suberect squamules. Ocular groove deep, anterior wall steep, portion posterior to eye flat, narrow, not longer than length of eye; finely punctured; bald. Ocular ridge prominent, slightly longer than eye, with erect, dense row of pale, club-shaped squamules on ridge. Vertex elevated; frons slightly so. Occipital impression shallow, short, punctured, sparsely squamulose. Occipit broadly rounded. Eyes not darker than body, with 23–24 facets dorsally, 5–6 ventrally. — Antennae relatively short, joints well separated, roundish, sparsely covered with golden-yellow, narrow squamules. Joint 1 slightly longer than 2; 3 shorter than 2 but longer than 4; 4–9 about even; 10 broader; 11 half length of 10, as broad as 9, plumose.

Prothorax. — Slightly narrower than long; roundedly broader at anterior third, slightly constricted at posterior fourth. More coarsely, closely punctured than head; sparsely covered with forwardly decumbent (in anterior half), suberect (posterior half) squamules as on head. Margins very densely covered with golden-yellow, long, erect,

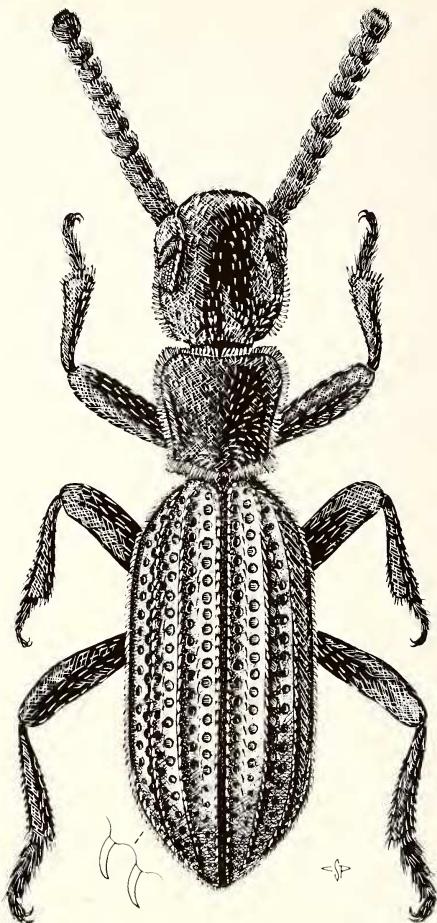


Fig. 45: *Araeoschizus doyeni* Papp, n. sp.

single row of squamules on sides; with multirow squamular border of same length at anterior, posterior margins; latter slightly separated at middle, squamules tend to lean towards posterior pronotal angles. Surface near posterior margin slightly impressed; squamules in this impression projecting outwardly, making this impression look deeper.

Elytra. — About one-fourth longer than head, prothorax combined; or two-and-one-half times length of head. Sides in center three-fifths parallel; shoulder much more broadly rounded than posterior end. Longitudinal rows of punctures in deeply set primary intervals large, roundedly hexagonal; deep. Primary cordae prominent, with posteriorly decumbent, pointed, curved squamules on ridge originating in round pit, which makes ridge somewhat corrugated in profile. Size of punctures slightly decreasing near shoulder area; more rapidly posteriorly, where they become small, sparsely spaced. Secondary row of squamules hardly present, composed of short, posteriorly recumbent,

sparse squamules; row 1 longest, not reaching shoulder or apical area; 2 shorter; 3 sometimes consisting of 2-3 squamules, or none. Squamular line on marginal ridge originates at level of anterior fourth of abdominal segment 3.

Underside.

Head. - Densely punctured with smaller punctures than dorsally; sparsely squamulose. Gular line hardly present, smooth, slightly impressed at broader posterior end; narrow medially. Basal groove of broad submentum shallow, area of rounded impression flat, finely punctured, not squamulose; post genal process broad, inner base slightly carinate, margin nearly flat; covered with longer, anteriorly decumbent squamules. Mentum slightly broader than long; squamules from center radiating outward towards sides, not to frontal margin. Margin of pit of ventral portion of eye deep, sharply edged. Antennal basal cavity similarly deep, narrow; almost black.

Prothorax. - Surface smooth with sparsely spaced punctures, distance between larger than diameter of punctures. Prosternal ridge hardly visible, anterior end prominent, posterior broadly widened into large posterior angle of prothorax which slightly narrows between coxae; surface on posterior half densely squamulose; anterior none. Anterior carina broad; black.

Hind body. - Surface smooth, decorated with larger punctures than those of prothorax; size of punctures gradually smaller posteriorly. Distance between punctures smaller than diameter on meso- metasternum, each puncture with flatly decumbent squamule not longer than diameter of puncture. Mesosternal process narrow. Intercoxal process of abdomen impressed, broad, frontal margin only slightly rounded. Punctures large, distance between less than diameter of punctures, with flat-laying squamules slightly longer than diameter of punctures. Size of puncture on abdominal segments gradually decreasing posteriorly, distance between, length of squamules slightly increasing so that segment 5 seems densely squamulose. Posterior margin of segments 1, 2 straight, 4 and 5 bow-shaped.

Legs. - Same size; median pair slightly smaller. Surface of femora, tibiae minutely densely punctate, with longer decumbent squamules than those on abdomen. Tibial groove short. Exterior edge of tibiae with decumbent, broader, slightly pointed squamules, interior edge with sharply pointed semierect, spine-like squamules. Tibial collar with short, sparse squamules shorter than others of tibia, tarsi sparsely covered with narrow, longish, somewhat paler decumbent squamules.

Length: 4.0-4.5 mm.

Holotype: California, Riverside County, Riverside Mountains, South side of Riverside Pass Road, April 27-July 18, 1978, F. G. Andrews and A. R. Hardy collectors (CAS).

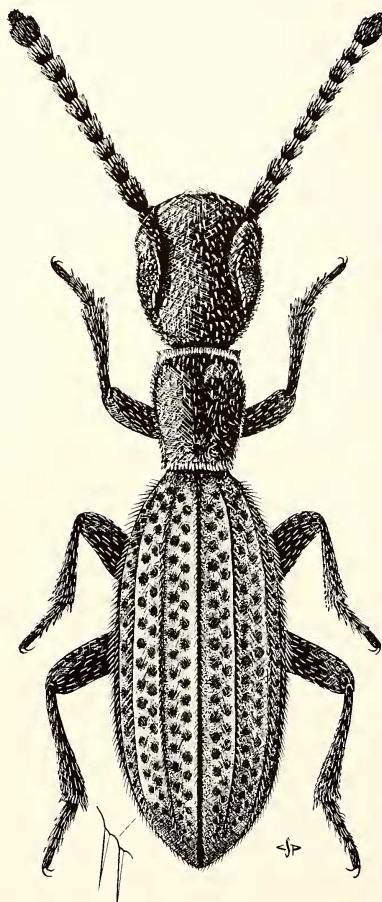
Paratypes: 6 specimens, same data (CDFA).

Araeoschizus exiguus Casey, Figs. 16a and 46.

Casey, Proc. Washington Acad. Sci., 9, 1907:486-487.

By its relatively large head, short prothorax, narrow shoulders, parallel sided elytra with long, sharply pointed straight erect to semierect squamules, this may easily be differentiated from any other species. Dark brown; shiny.

Head. — Slightly longer than broad across ocular lobe. Surface with deep punctures, each puncture with semi-erect, anteriorly leaning, distally broader thin squamule, which are erect on sides, occipital region. Preocular lobe prominent, highly elevated; ocular ridge shallower than lobes, with row of squamules larger than those of head. Interior margin of preocular lobe deep, sides compressed before eye; posterior portion short, coarsely punctured. Vertex highly, roundedly elevated, occipital area broadly rounded; frons slightly so. Eyes large, black, with 21 facets dorsally, 5 ventrally. — Antennae slender, broader distally; long, almost reaching posterior prothoracic margin; densely squa-

Fig. 46: *Araeoschizus exiguus* Casey

mulose. Joints well separated; 1 slightly longer than 2; 3 shorter than 2, but longer than 4–9; 10 broad, flat; 11 about long as broad; 1–9 evenly squamulose; squamules on 10 thinner, longer; more hair-like on 11. Squamules pale yellow. Joints slightly darker than body.

Prothorax. – One-fourth longer than broad; anterior margin about long as posterior; sides slightly curved about middle of anterior half; gradually narrowing toward posterior. Surface finely punctured, sparsely covered with thin, longish, narrow, erect to semierect squamules. Sides more densely squamulose; anterior- posterior margins more so. Middle of surface slightly flattened longitudinally, near posterior margin lightly impressed, with weak rosette-like arrangement of thin, erect squamules. Squamules on anterior, posterior margins longer, very densely spaced in multirow arrangement, golden-yellow.

Underside.

Head. – Surface sparsely punctured with minute, deep punctures; almost half of punctures with short, forwardly decumbent squamules. Submentum broad, frontal edge deeply set; basal groove deep, broad, reaching to bases of broadly pointed process. Gular area bald, gular line absent, instead one pair of circular impressions about posterior fourth of head, near anterior tip of gula; typical for *exiguus* and *tenuis*.

Prothorax. – Smooth, very scarcely punctured; squamulose only on narrow prosternal ridge, on broadly curved posterior process.

Hind body. – Mesosternum extremely short, smooth, shiny, with few narrow, posteriorly decumbent squamules on surface at mesosternal process. Mesocoxa with 4–5 thin squamules ventrally. Mesosternum smooth, sporadically decorated with various sizes of punctures, some only on middle with decumbent, narrow squamules nearly twice diameter of puncture where they originate. Abdominal segments smooth, shiny, minutely punctured, each puncture with very thin posteriorly decumbent squamules. Marginal row of squamules present only on posterior margins of segments 3, 4. Surface of 5 with somewhat broader squamules closely set especially toward edge; punctures very minute.

Legs. – Uniform in size, however anterior pair slightly smaller. Uniformly, sparsely covered with pale, narrow, decumbent squamules. Tibiae more densely squamulose. Squamular collar of short, pointed, pale squamules.

Length: 3.25 mm.

Holotype: California, Palm Springs (USNM No. 46394).

Distribution:

Known only from the holotype.

Araeoschizus microcephalus Papp, new species, Figs. 16c and 47.

Resembles *regularis* Horn. Differs in having relatively smaller head, the prothorax continuously, evenly rounded dorsally. Secondary row of squamules present, not in *regularis*. Dark brown, sparsely squamulose.

Head. — Almost as broad as long, occasionally frontal margin slightly more extricated; slightly longer, nearly as wide as prothorax at widest point. Sides more or less parallel, ocular lobe not conspicuous; posterior occipital angle narrowly rounded. Surface with larger shallow punctures; sparsely covered with pale yellowish, short, stubby squamules. Angle of ocular lobe sharp; outer angle broadly rounded; its interior margin conspicuous, deep. Preocular angle well defined, frontal margin of head flatly (or slightly more so) rounded. Ocular groove deep, reaching half way through occipital posterior curvature of head; anterior portion short, triangular, pointing toward peak of ocular lobe. Vertex broad; no occipital groove; surface slightly more elevated than that of frons; no visible division (in usual form of slight impression) between vertex, frons. Eyes large, broad; 13–14 facets dorsally, 5 ventrally. — Antennae slender, reaching posterior fourth of prothorax. Joints well separated; uniform in width, slightly broader toward end; joint 1 shorter than 2, 3 combined; 2–6 about even in length; 7 slightly shorter; 10 broader, wider, flat; 11 short, about one-fourth 10. Sparsely squamulose, squamules larger than those of head, inwardly curving, pale goldish yellow; on 9, 10, 11 with somewhat thinner, longer squamules intermixed especially on anterior margin. Darker brown than head, only joints 10, 11 lighter.

Prothorax. — About wide as long, broader in anterior third; sides broadly rounded, slightly constricted in posterior half, about parallel before posterior angle. Anterior pronotal angle rounded amrgin straight; posterior margin similarly; both with very dense row of short, golden-yellow squamules. Surface rounded, occasionally top in interior third slightly flattened; with large punctures, some with pale, anteriorly decumbent short squamules. Posterior third of surface with squamules projecting upward on sides, more so before posterior margin, many erect to semierect, those at middle near basal margin, exteriorly projecting, are more erect, slightly longer. Margins on sides very sparsely lined with short, pale squamules.

Elytra. — Width twice, or slightly less, length; sides parallel; shoulder narrowly, anterior end broadly rounded. Primary costae prominent, obtusely annulated, each annule with short, curved, posteriorly recumbent, pointed squamules, one almost touching others below middle or close to base. Each primary interspace with two rows of large, impression-like punctures; between puncture lines a slightly elevated secondary costae, with flat, toward tip broader, decumbent row of squamules more sparsely spaced than on primary costae. Primary costae entire anteriorly; posteriorly costa 1 longer than 2; 3 joins margin behind end of 2. Third primary interval narrower than others; two puncture lines less prominent, secondary row of squamules not present. Marginal fold with two less prominent puncture lines, slightly broader in anterior half, with no secondary row of squamules. Elytral margin cordated at posterior third; from about middle of abdominal segment 3 lined with shorter, decumbent squamules.

Underside.

Head. — Surface very smooth, sporadically punctured with very small, deep, sharply outlined punctures, some with very short, forwardly decumbent pale squamules. Gula not punctured, broad at base, rapidly, triangularly narrowing anteriorly, with well defined anterior triangular tip. Submentum large, broad, margin straight, slightly annulated;

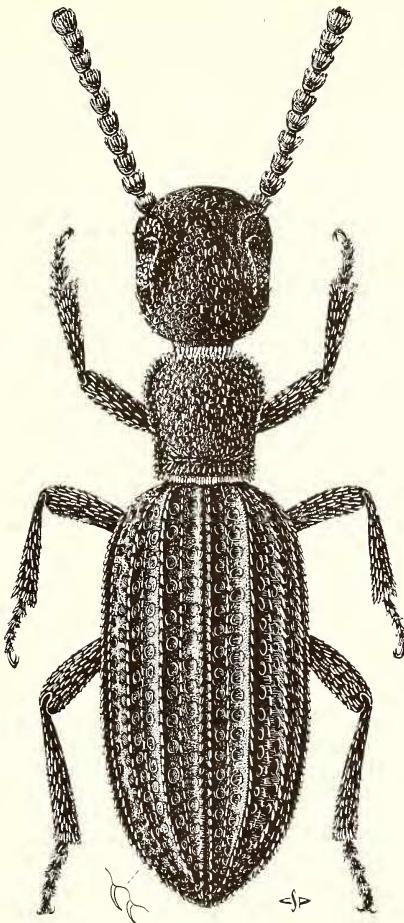


Fig. 47: *Araeoschizus microcephalus* Papp, n. sp.

process large, interior base deeply carinate, tip broad, rounded; basal groove deep, extends to level of interior base of proboscis, at middle deeply impressed, broad impression bluntly-triangularly gradually diminishing toward anterior triangular tip of gula. Margin of pit of ventral portion of eye prominent, pit black, interior marginal outline reaches base of process; anterior margin of pit prominent. Antennal basal cavity deep, with broad margin exteriorly, posteriorly. Area behind ventral ocular margin usually more squamulose.

Prothorax. — Smooth, with few longer, shallower punctures than head; dark brown, center of anterior middle, margins of coxal cavity, prosternal process black. Prosternal ridge shallow, flatly rounded, slightly elevated anteriorly. Few posteriorly decumbent squamules on prosternal ridge, more outwardly radiating on surface of prosternal process, which is broad, abruptly curving toward posterior margin. Hypomeron with smaller, more scattered punctures with no squamules. Anterior margin narrow, with row of minute squamules from posterior angle halfway to marginal base of prosternal process.

Hind body. —Dark brown, shiny, edges of bodyparts darker brown to black. Mesosternum smooth, with very few shallow punctures; mesosternal process narrow at middle, slightly broader at almost flat posterior end, with few posteriorly projecting larger, flat squamules mostly on edges. Mesocoxa not squamulose. Metasternum, abdominal segments with larger, closely placed punctures, each with decumbent, flat squamules; size of punctures, squamules gradually smaller toward posterior of body; squamules from abdominal segment 3 become narrow, narrower on 4, almost hair-like on 5 where numerous, dense on sides, posterior margin.

Legs. —Slender, almost uniform size, middle pair seem to be slightly smaller. Squamulose; squamules larger than on body; denser on ventral edges of femora; on all narrow edges of tibiae, on ventral sides of tibiae with few semierect, slightly heavier ones on posterior half; end of all tibia with row of short squamules. Tarsi densely covered with somewhat longer squamules.

Length: 3.9–4.1 mm.

Distribution:

Holotype: Mexico, 92 km N of Chihuahua, Chih., July 30, 1947, collected by Dr. M. Cazier, David Rockefeller Mexican Expedition (AMNH).

Paratype: 13 specimens from the same location, are in the collections of AMNH (9), CAS (2), and CDFA (2).

Additional specimens, all from the state of Chihuahua, Mexico: 20 mi. S Ciudad Juarez, IV. 13. 1961, Dr. H. F. Howden 3, (CNC); Santa Clara Canyon, 5 mi. W of Parrita, VI. 6. 1954, J. W. Mac Swain and E. I. Schlinger 1 (UCB); Samalayuca, VI. 24. 1947, G. M. Bradt, 1 (AMNH).

Araeoschizus setosiformis Papp, new species, Figs. 16a and 48.

Easy to separate from any other closely related species by its broadly-triangularly shaped prothorax, narrow long body, and thin, hair-like goldish-yellow squamules. A shiny, dark brown species.

Head. —Slightly longer than broad; sides parallel; front flatly-, occipital area broadly rounded. Surface punctured; punctures elliptical, closely spaced, densely covered with thin, anteriorly decumbent squamules much longer than diameter of punctures. Ocular lobe not prominent, darker, roundedly pointed, densely squamulose. Ocular ridge short, reaching posterior end of eye; covered with decumbent squamules throughout. Ocular groove deep, smooth; portion anterior to eye short, posterior as long as eye. Margin of head densely covered with suberect, anteriorly curving squamules. Occipital impression shallow, punctured, with short erect squamules. Eyes darker than body, with 17 large facets dorsally, 4 minute ventrally. —Antennae uniformly brown, minutely punctured, each puncture with long golden-yellow squamule, which is somewhat longer, thinner from joint 4 to end; extremely fine on 10, 11.

Prothorax. —About one-sixth shorter than broad at broadest point. Densely punctured, distance between punctures about size of diameter of punctures; each puncture

with squamules as on head. Anterior angle rounded; sides straight, posterior margin narrow as distance between anterior base of ocular ridge. Anterior margin straight, about in center third broadly black; with erect multirow of squamules of same size as on sides. Posterior margin with multirow of shorter, erect squamules projecting outwardly from center, where small rosette-like squamular formation creates small surface impression.

Elytra. — Slightly more than one-third longer than head-prothorax combined. Longitudinal squamular lines appear uniform, however those on elevated primary cordae longer, reaching behind half length of next; posterior decumbent; secondaries somewhat shorter; all thin, long sharply pointed. Puncture lines deep, distance between punctures about size of diameters of punctures; gradually smaller posteriorly. Sutural groove deep, broad; costae squamulose as primary cordae. Primaries anteriorly entire, posteriorly 1 ends near apical portion of elytra; 3 slightly longer, joins margin behind end of shorter 2. Secondaries shorter, 1 longest (but shorter than primary 2), others shorter yet, but longer

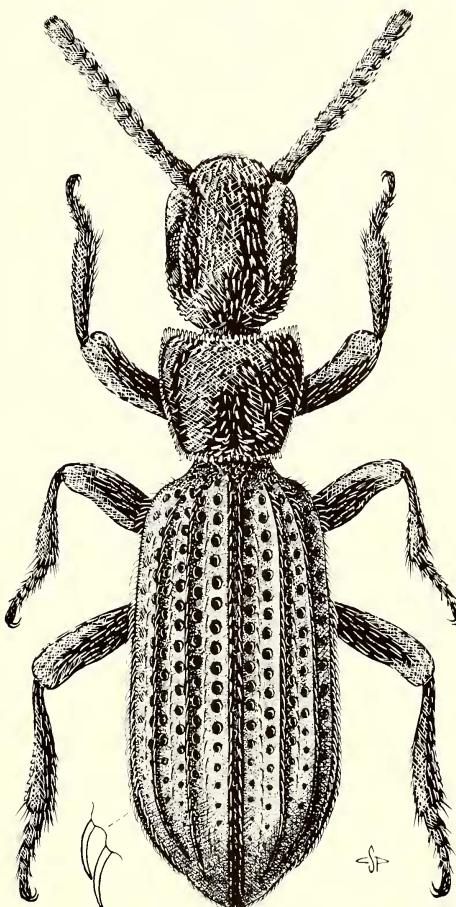


Fig. 48: *Araeoschizus setosiformis* Papp, n. sp.

than two-thirds of elytra. Marginal squamular line originates at level of posterior margin of abdominal segment 2.

Underside.

Head. – Surface minutely punctate, with thin, almost colorless, anteriorly decumbent hair-like squamules. Gula bald, gular line absent. Submentum broad with shallow impression behind middle of margin; proboscis broad, relatively short, interior base carinated, surface squamulose as rest of head. Mentum large; heavier golden-yellow squamules radiating outwardly from center. Maxillary palpus lighter brown, sparsely covered with thin, hair-like squamules.

Prothorax. – Sparsely covered with deep, round punctures; distance between punctures 3 to 4 times diameter of punctures. Prosternal process broad, with larger punctures, moderately densely covered with decumbent squamules as on metasternum. Prosternal ridge weak, posterior half squamulose. Anterior carina narrow, shallow, black.

Hind body. – Surface smooth; sparsely punctured, each puncture with posteriorly decumbent thin squamules, about two times as long as diameter of puncture. Mesosternal process – especially margin – densely covered with thicker squamules, as metasternum. Thickness of squamules, size of punctures gradually decreasing posteriorly; smallest on segment 5. Squamules posteriorly decumbent, orderly placed throughout; denser on apical segment.

Legs. – Anterior pair somewhat heavier, posterior longer, middle shortest. Densely, uniformly squamulose throughout. Tibial groove on ventral side of anterior, posterior femorae entire; on middle half of length of femora; deep. Tibial collar consists of heavier, sharply pointed squamules. Tarsi squamulose as side of tibia.

Length: 4.25 mm.

Holotype: Utah, Grand County, Arches National Monument, May 12, 1969, R. L. Westcott collector (CAS).

Paratype: One specimen with same data (CDFA).

Araeoschizus similaris Papp, new species, Figs. 16a and 49.

Similar to *decipiens* Horn from Arizona. Differs by the ratio, size, shape of head, prothorax; size, thickness of antennae; the more narrowly rounded shoulders, slender body. Reddish dark brown, shiny.

Head. – Slightly longer than wide (as long as prothorax), sides nearly parallel, slightly constricted at eye level. Densely covered with pale yellow, club-shaped, recumbent squamules originating in well defined, deep punctures. Ocular lobe broadly rounded, very densely squamulose. Ocular ridge short, sharply curved, well elevated, densely squamulose. Vertex moderately convex, occipital impression shallow, short. Frons more convex, lighter brown anteriorly; interior margin of preocular lobe deep. Ocular groove broad, deep; surface roughly granulose, darker brown; sides with anteriorly decumbent dense row of squamules; anterior portion extremely short, consisting of base of angularly

shaped posterior wall of preocular lobe reaching eye. Eyes deeply set, in length much shorter than posterior portion of ocular groove; 14–15 facets dorsally; 6 facets on ventral portion placed in two even rows, facets opposite each other; smaller. — Antennae long, narrower than *decipiens*, reaching anterior fifth of prothorax. Joints well separated; 1 longest; 3 shorter than 2; 4–9 even in length; 10 half again as long as 9; 11 short, about half 10, with rounded tip; 10 slightly flatter laterally. Densely squamulose; yellow squamules size of those on dorsum of prothorax; mostly on center edges of the round, shiny, dark brown segments.

Prothorax. — About as long as broad, broadest at anterior third; sides evenly rounded from anterior margin, slightly constricted in posterior third; posterior pronotal angle not protruding. Frontal margin slightly bent forwardly; posterior about straight. Surface densely covered with longer, pale yellow recumbent squamules protruding from well defined deep punctures. Diagonally evenly rounded; slightly impressed in middle

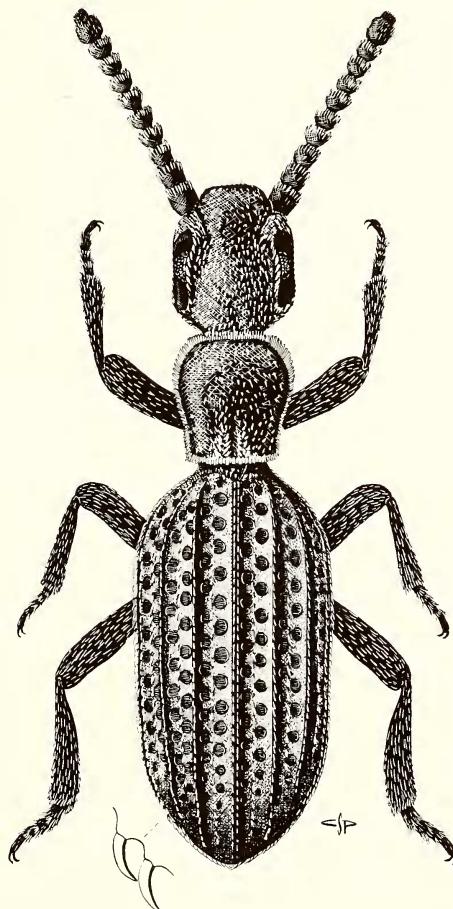


Fig. 49: *Araeoschizus similaris* Papp, n. sp.

near posterior margin with two closely placed tufts of longer, more dense erect squamules. Squamules on frontal two-thirds anteriorly decumbent. Margins densely squamulose, denser, longer on anterior margin than on sides; posteriorly more so.

Elytra. — A little less than twice as long as broad, sides parallel in middle half; shoulder less, posterior end more broadly rounded. Fused outline of scutellum visible, enclosed area black, surface with two sharp longitudinal costae; with few minute squamules between. Primary costae slightly more prominent than secondaries; anteriorly entire, posteriorly 1 longest, ends near where 3 joins margin; 2, 4 about even; with dense, short, curved squamules originating from saw-toothed edges of ridges, sharply pointed, overlapping. Secondary row of squamules on shallower base, squamules narrower than primaries, same size as sutural marginal lines, not overlapping. Secondary costa 1 longest, 3 shortest; all shorter than primary costae next on each side; not present in interval 4. Puncture lines very deep, edges of punctures rounded; distance between punctures about as wide as diameter of punctures.

Underside.

Head. — Coarsely granulated; all but well outlined gular, squamulose. Mentum large, longer than wide. Frontal edge of sublabial plate deeply set, almost in level of base of large, broad proboscis; black; margin unevenly, roughly annulated. Basal groove of submentum very broad, deep, reaches posteriorly in a well defined semicircle impression one-third toward base of head. Surface between posterior end of head, sublabial plate markedly convex, making basal groove of submentum appear deeper.

Prothorax. — Very sparsely, minutely punctured. Squamulose only on prosternal process. Prosternal ridge convex, abruptly ending anteriorly before margin of prothorax.

Hind body. — Densely punctured with egg-shaped large punctures, each with long, decumbent squamules, not longer than length of puncture. Mesosternal punctures larger (length of decumbent squamules), size gradually smaller, diminishing toward posterior of body; hardly visible on segment 4, 5. Middle surface of 4, 5 with hair thin squamules, edges densely covered with broader, longer squamules, about same as on segment 3.

Legs. — Slender; median pair slightly smaller. Femora evenly, densely covered with even decumbent squamules; tibiae with much broader, recumbent squamules on dorsal side, with few hair-like squamules on posterior third of ventral side; collar not distinct. Tarsi with 2-3 broad squamules on dorsal side, rest with narrower, slightly longer squamules.

Length: 3.9-4.1 mm.

Distribution:

Holotype: New Mexico, U.S.A. Sierra County, Hot Springs (also known as Truth of Consequences), 1280 m., II. 5. 1940. O. Bryant (CAS).

Paratype: 5 specimens, same location. CAS (3), CDFA (2).

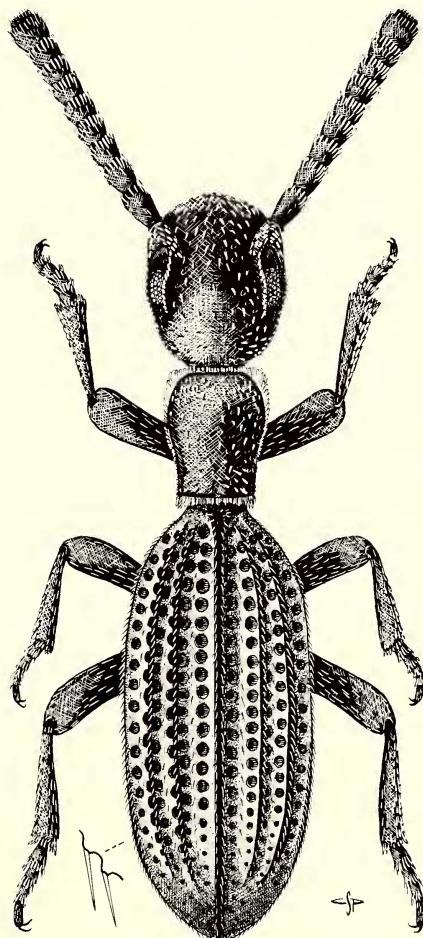
Additional specimens from New Mexico, Sierra County, Hot Springs, East of Elephant Butte Dam on road to Elgin. II. 1. 1940. O. Bryant (CAS).

Araeoschizus tenuis Casey, Figs. 16a and 50.

Casey, Proc. Washington Acad. Sci., 9, 1907:486.

A Shiny, reddish brown species. By its slender body, proportionally large head, narrow, long, apically evenly rounded elytra, and short, suberect, spine-like squamules on ridges it is easily differentiated. Similar to *sulcicollis*.

Head. — As long or slightly longer than wide at widest point. Sides not parallel, slightly broader at eye level. Coarsely, shallowly punctured, sparsely covered with short, anteriorly decumbent, club-shaped pale squamules. Ocular lobe broad, highly elevated; interior margin deep. Ocular ridge shallow, only posterior half slightly elevated; with erect squamules. Vertex prominent; frons slightly shallower with dense accumulation of squamules on anterior fourth. Ocular groove deep, broad; portion anterior to eye deepest; bald. Eyes relatively small, 15–16 facets dorsally, 4 ventrally. — Antennae robust,

Fig. 50: *Araeoschizus tenuis* Casey

slightly darker than body, especially segments 1-3; sparsely squamulose; anterior margin of each joint with row of apically uniform squamules; joint 10, 11 with hair-like squamules; 11 plumose.

Prothorax. — Without marginal row of erect squamules, narrower than head; about one-fourth longer than broad at broadest point. Surface densely covered with minute punctures, some with short, erect squamules similar to those on head. Sides slightly constricted at about posterior fourth. Anterior, posterior margins about same width; with erect, golden-yellow, densely spaced rows of squamules. Posterior margin with slight medial impression, where squamular margin continuous. Surface uniformly concave.

Elytra. — Slightly more than twice as long as broad; sides in mid-half nearly parallel; shoulders slightly more narrowly rounded than posterior end. Primary cordae moderately elevated; corrugated; pits of posteriorly decumbent, straight, sharply pointed squamules prominent; secondaries with shorter, sparser, posteriorly curved squamules. Puncture lines prominent; distance between punctures less than half diameter of punctures; size gradually decreasing, distance between increasing posteriorly; slightly less anteriorly.

Underside.

Head. — Covered with closely placed, minute punctures, distance between punctures less than diameter. Glabrous. Surface convex medially; gular line absent; gular area deeply impressed, especially two distinct large puncture-like impressions at anterior end of gular area (similar to *exiguus*). Submentum distinctly elevated, processes prominent; margins impressed medially; black; process broad, as broad at base as long, gradually narrowing toward rounded pointed end; interior base broadly carinate, with few, short decumbent squamules similar to those on margin of ventral surface of head. Mentum deeply set, small, sides, frontal margin evenly, continuously rounded; black with few short exteriorly radiating pale squamules. Basal groove of submentum shallow, visible, reaching between bases of post genal process. Antennal basal cavity deep, four facets of ventral portion of divided eye deeply set in same plane, e. g. bottom of ventral ocular pit flat.

Prothorax. — Shiny, with sparsely spaced shallow punctures, especially sides. Prosternal ridge shallow, evenly rounded, not distinct. Prosternal process sharply constricted medially, broad behind coxal cavity, then sharply narrow, curved dorsally. Procoxae smooth, bagrous.

Hind body. — Mesosternum similar to *exiguus*, short, compressed. Mesosternal apophysis with width even, anterior edge slightly impressed; edges with few posteriorly decumbent pale, flat squamules. Mesocoxae glabrous. Mesosternum smooth, sparsely decorated with punctures slightly larger than those on first abdominal segment; distance between punctures more than diameter; each puncture with short squamules radiating from anterior wall of puncture, not longer than diameter. Abdomen visibly flat longitudinally medially; both edges of segments black. Surface shiny, smooth, sparsely punctured; punctures nearly round, edges sharp, shallow, those on flat middle portion with decumbent squamules, squamulae longer in medial holes at sides, short or absent on sides.

Punctures on segment 1 larger; sizes decreasing posteriorly; minute on 5, where margin more densely covered with short, pale yellow, anteriorly decumbent squamules. Margin of elytra not cordated, glabrous, two puncture lines on marginal fold more or less deep, slightly sparser than in other elytral interspaces; no secondary row of squamules; margin with erect squamules from about level of abdominal segment 4, which are shorter than those of fourth primary costa at same level.

Length: 3.2–3.5 mm.

Distribution:

Holotype: Tucson, Arizona, H. F. Wickham (USNM., No 46393). Specimen locality label: Ari; Tucson added after Casey (l.c., p. 486).

Additional distributional data:

Arizona: Tucson, III. 15. 1940, by Bryant (CAS) 65 specimens; VIII. 10. 1939, by Bryant (CAS) 1 specimen. – 5 mi. N. Mammoth, Pinal County, VII. 12. 1973, by D. S. Chandler (DC) 2 specimens. – Catalina Mountains, Sabino Canyon, IV. 18. 1963, by Seaberg (OSUC) 1 specimen. – Buckeye, V. 2. 1942, by I. La Rivers (DAN) 5 specimens.

***Araeoschizus utahensis* Papp, new species, Figs. 16a and 51.**

Blackish brown to brown. With relatively short, thin antennae; large head and prothorax with a dense, "scaly"-like coverage of short, broad squamules; narrow, parallel sided body, easily differentiated from any other species.

Head. – Not quite one-fourth longer than prothorax; slightly less broad as long. Ocular lobe prominent, angle sharply rounded; interior margin deep, curved. Ocular groove short, portion anterior to eye is less than half size of eye, posterior part about size of eye. Ocular ridge short, higher about posterior half of eye. Eyes with 19 facets dorsally, 5 ventrally. Sides of head almost parallel, slightly constricted about middle of eye; occiput broadly rounded; frontal margin of head straight or slightly indented, with three or four sharp annules, from which longer, curved setae projecting inward. Occipital impression small, very shallow. Vertex hardly convex between posterior ends of ocular ridges; from here gradually slanted into flat frons. Surface shiny, finely, closely punctulated. Entire surface very evenly, densely covered with flat club-shaped, forwardly decumbent pale, watery colored squamules; those on frons evenly narrow, slightly longer. – Antennae slender, covered with very tightly leaning longer, sharply pointed pale squamules. Joints evenly round, not flattened, except 10, which is covered with hair-like pale squamules, about three times longer than 11, which is prominent, round, with densely plumose flat tip with several hair-like longer squamules protruding at its edge.

Prothorax. – Perfectly matching base color, surface structure, density, color, positioning of squamules as head. Anterior margin straight at middle, with broadly rounded angle; broadest at middle of anterior third, then slightly constricted toward posterior angle. Posterior margin straight, deeply impressed in middle, where several golden-yellow squamules placed radially around rim of depression; densely covered with short golden-yellow squamules. Median longitudinal surface anteriorly from basal impression

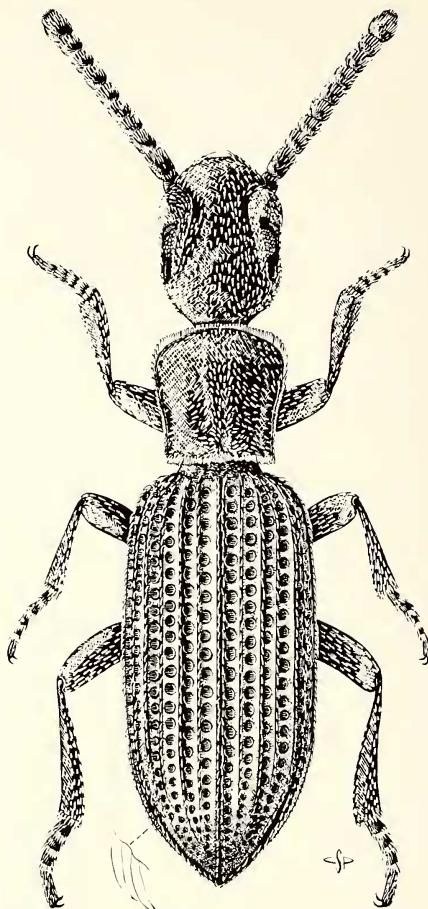


Fig. 51: *Araeoschizus utahensis* Papp, n. sp.

flatter, not following curvatur of sides of prothorax, which is covered with uniform, pale squamules leaning anteriorly. Squamules on sides of same size, color, pointing perpendicularly toward middle. Anterior margin at middle with shorter squamules, those on anterior angle longer, erect; shorter, recumbent posteriorly. All squamules (except those of posterior margin) pale, watery colored, somewhat longer at posterior third. Density uniform. Generally: squamules slightly longer on prothorax than on head; density, color, the same.

Elytra. — Of same color; shiny. About one-third longer than head, prothorax combined. Shoulders broad, posterior end sharply, narrowly rounded. Sides otherwise parallel. Sutural costa slightly elevated, broad, groove flat, surface covered with single row of small punctures; distance between punctures slightly more than 1.5 times diameter; sutural lines covered with posteriorly decumbent, pointed, narrow overlapping squamules.

Primary costae slightly more elevated than secondaries. Two longitudinal puncture lines in primary interspaces; punctures round, deep, large; distance between punctures narrow, about half of diameter of punctures. Secondary costae much shallower. All costae covered with line of long, pointed, pale colored row of squamules. Squamules slightly longer, less decumbent in humeral area. Primary cordae originates at base of elytra; 2 longer than 3, not reaching tip of elytra; 3 entire, joining margin behind end of 1; 4 shorter than 2. The anterior fifth of elytral margin slightly cordated, with row of similar squamules. Puncture lines on 4 interspace very congested, unorganized, shallow; interspace narrow, secondary row of squamules represented by few scattered, long, thin squamules, or none.

Underside shiny, dark brown, margins of body parts black. Very sparsely squamulose.

Head. – Almost smooth; surface very finely, sparsely punctured. Sublabial plate broad, margin impressed in middle, at base of blunt, broad proboscis; basal groove deep, long, reaching middle of base of proboscis. Gular line broad, smooth, narrower behind posterior three-fourth of length. Mentum broader than long, surface with outwardly projecting larger, decumbent squamules (largest squamules on underside). Maxillary palpus dark, joints slightly longer than broad; terminal joint as long as 2, 3 combined; with narrow, flat tip of lighter color. Ventral ocular groove very small; margin of pit fused with extended broad base of post genal process. Antennal basal cavity large, deep, black; basal joint of maxillary palpus well exposed. Surface covered with very pale, short, forwardly decumbent squamules, which are slightly thicker, longer at occipital region.

Prothorax. – Shiny; smooth between sparsely spaced, shallow punctures. Prosternal process very broad, gradually, triangularly pointed posteriorly; surface from anterior part of procoxa to end densely covered with squamules of size, shape, color as on mentum. Margin almost straight, slightly bent near anterior angle, covered with row of erect, pale squamules.

Hind body. – Punctures on meso-, metasternum same size, density. Mesosternal apophysis more elevated, sides almost parallel; posterior margin nearly straight, surface squamulose. Metasternum with smaller, posteriorly decumbent squamules, each originating in puncture. Metacoxal process of abdomen broad, triangularly rounded; punctate. Punctures, squamules gradually getting smaller posteriorly, also squamules toward sides if segments present. Abdominal segment 4, 5 impressed at middle of anterior margins.

Legs. – Median pair smallest; frontal with well developed femora shorter than hind pair. Tibial groove on frontal femur deep, broad, long, almost reaching base of femur; slightly narrower, shorter on median femur; hind narrowest, where sharply pointedly ending about basal three-fourth of length. Surface evenly covered with narrow, decumbent, pale squamules of same length as on side of head. Tibia (1 broader than 2) densely squamulose; sides with narrow, thin edges with broader squamules; anterior edge on widened end with several longer, spine-like squamules. Tarsi similarly squamulose.

Length: 4.0–4.2 mm.

Distribution:

Holotype: U.S.A. – Utah, San Juan County, 5 miles W of Bluff, “Bluff” Dunes. July 24, 1978. Collected by Dr. Fred G. Andrews and Dr. Alan R. Hardy. In the collection of CAS.

Paratypes: 8 specimens with same data as holotype. In the CDFA collection.

Key to the species in group VI.

1 Surface of body between punctures very smooth 2

– Surface of body between punctures coarse 4

2 Head as long as broad between ocular lobes. Prothorax about one-fourth narrower than head at widest point; both evenly, densely squamulose; posterior fourth of prothorax more so; anterior and posterior margins of the latter with a very dense band of closely spaced longer, goldish squamules 3

– Head longer than broad between ocular lobes. Prothorax slightly narrower than head at widest point; both very sparsely squamulose; anterior and posterior margin with band of goldish squamules. Longitudinal puncture lines of elytra with small, sharply edged punctures; cordae distinctly elevated, with dense row of short, sharply pointed, curved squamules. Length: 4.2–4.6 mm. (SW tip of Sonora Prov., Mexico) *giulianii* n. sp.

3 Punctures in lines relatively small, deep, with sharp edges. Cordae distinctly elevated, with row of long, straight, erect, sharply pointed squamules. Length: 4.0–4.2 mm. (E San Diego Co., California) *kaszabi* n. sp.

– Punctures in lines minute, shallow; edges of punctures very obscure. Cordae sharply elevated, with row of decumbent, very short, closely spaced, curved, sharply pointed squamules. Length: 4.5 mm. (NE Pima Co., Arizona) *kubai* n. sp.

4a Elytra less than one-and-one-half times longer than head and prothorax combined; head one-fourth longer than prothorax; both very densely covered with short, thick squamules; margin of prothorax with dense row of somewhat larger squamules. Cordae sharply elevated, densely covered with erect, at tip curved, club-shaped squamules. Length: 4.9–5.1 mm. (Zacatecas Prov., Mexico) *problematicus* n. sp.

4b Elytra more than one-and-one-half longer than head, prothorax combined. Prothorax long as broad, evenly, broadly rounded anteriorly, slightly constricted in posterior half. Length: 3.8–4.0 mm. (SW Texas, New Mexico, Arizona; Mexico, Chihuahua) *simplex* Casey

– Prothorax long as broad, shorter than head; narrowly rounded anteriorly; slightly constricted in posterior fourth. Length: 4.0–4.25 mm. (SW Utah) *hardyorum* n. sp.

Araeoschizus giulianii Papp, new species, Figs. 16c and 52.

Shiny, dark brown, with short, stubby antennae, relatively small puncture lines on elytra, the ending of primary costa 3 smooth; sparsely, minutely punctured prothorax; short pale squamules are the main characteristics.

Head. – Not quite one-fourth longer than broad at ocular lobes, occasionally slightly broader opposite posterior of eye; slightly longer than prothorax. Ocular lobe prominent, broadly rounded; with decumbent squamules. Surface sparsely punctured with slightly larger punctures than prothorax; sparsely squamulose, more so at posterior vertex. Frontal margin of head flat, with 6–8 shallow annules, without long, hair-like squamules. Preocular angle deeply set behind angle of ocular lobe. Ocular ridge short, with short decumbent, pale squamules; fusing with vertex behind eyes. Ocular groove deep, broad, long; anterior portion short, composed of shallow, deeply slanted posterior wall of ocular lobe; anterior portion long, reaching occipital curvature of head; surface finely granulose, shiny. Eyes large, 16 facets dorsally, 5 ventrally. Occipital curvature varies: broadly, or occasionally narrowly rounded; occipital impression narrow, deep, barely one-fourth length of head. Vertex sharply elevated at posterior half at about anterior end of occipital impression, then gradually, flatly sloping anteriorly into slightly convex, lighter brown frons. – Antennae short, hardly reaching middle of prothorax. Joints close, each brown medially, blackish brown or black at both ends. Densely covered with slightly longer, broader, more pointed squamules than frons. Joint 1 longest; 2–3 shorter, uniform size; 3–5 uniform size; 6–10 gradually broader; 10 one-fourth broader than 2; 11 short, lighter brown, two-thirds size of 11, tip round, plumose; 10–11 sparsely covered with hair-thin squamules.

Prothorax. – Shiny, dark brown, edges black. Surface with sporadically placed smaller punctures than those of head. Slight impression on surface near middle of posterior margin, with few outwardly projecting longer pale squamules. Broader just before middle; more or less triangularly rounded with sides straight before, behind broader portion. Anterior, posterior margins of same width; anterior distinctly bow-shaped, posterior less so, almost straight. Surface sparsely squamulose, more so toward margins. Anterior, posterior margins with dense, dark goldish yellow stubby squamules, sides with shorter, forwardly decumbent, pale yellow squamules. Middle usually glabrous.

Elytra. – One-third longer than head, prothorax combined; twice as long as broad; shiny, dark brown; broadly rounded anteriorly, less so posteriorly; sides parallel. Primary costae prominent, very minutely annulated, each annule with short, sharply pointed, medially slightly broader, recumbent, pale squamules. Costa 1 longest; 3 joins 4 before end of shorter 2. Interspace 4 almost half as narrow as 1. Primary interspaces each with two rows of punctures; punctures deep, edges rounded. Puncture lines in narrow primary interspace 4 smallest, opposite, much shallower than others. Margin of elytra from posterior margin of abdominal segment 2 covered with row of squamules.

Underside.

Head. – Smooth, shiny, with small, shallow, sporadically placed punctures. Surface sparsely evenly covered with short, flat, decumbent pale squamules. Gular line broad ba-

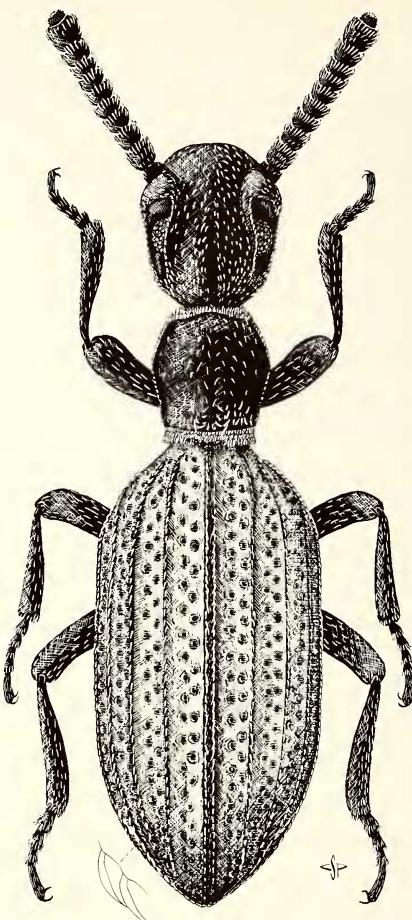


Fig. 52: *Araeoschizus giulianii* Papp, n. sp.

sally, gradually narrowing toward deep, short basal groove of post genal process; not squamulose. Mentum large, impressed at middle, rounded at anterior margin, with few longer squamules radiating exteriorly near edges. Galea, maxillary palps slightly lighter brown. Submentum erect, process prominent; margin deeply set slightly projecting exteriorly. Gena flat. Margin of pit of ventral portion of eye shallow, hardly present. Antennal basal cavity deep, black.

Prothorax. — Shiny, same color as head; margins, including those of coxal cavity, black. Prosternal ridge not uniform, posterior half impressed, slightly elevated again before prosternal process; anterior end not reaching margin of prothorax. Prosternal process pointedly broad behind coxal cavity; middle impressed; posterior end sharply dropping toward posterior margin of prothorax; here sharply constricted in middle, broad at base. With few short, pale squamules over prosternal ridge; squamules slightly longer on

prosternal process (longer than those of head), following margin of process, then symmetrically radiating outwardly over curvature of prosternal process. Otherwise surface not squamulose.

Hind body. – Slightly darker brown anteriorly, gradually lighter toward posterior end. Mesosternum smooth, shiny, only with few, sporadically placed shallow punctures. Mesosternal apophysis narrow, slightly constricted medially, its broader end with flat margin, slightly convex surface, covered with few outwardly radiating squamules of smaller size than of prosternal process. Mesosternum, subsequent segments with larger, sharp-edged, shallow punctures; distance between punctures on metasternum less than diameter of puncture; on abdominal segment 1 about size of punctures; on 3, 3, 5 distance gradually increases as punctures get smaller. Each puncture with flat, pale yellow, posteriorly decumbent squamule; size of squamules decreasing toward anterior of body, denser, yellowish, longer on sides of segments 4, 5. Margins of segments black. Episternal area of metasternum not squamulose, with few small punctures.

Legs. – Front pair with robust femora, shortest, hind pair longest; slightly lighter in color. Squamules short, narrow, decumbent, moderately densely spaced. Squamular collar at posterior end of tibiae composed of short squamules. Tarsi sparsely covered with squamules similar in size to those of tibia.

Length: 4.2–4.6 mm.

Distribution:

Holotype: Mexico, Sonora, sand dunes at Huatabampito, April 22, 1974, Derham Giuliani (CAS).

Paratype: Seven specimens with same data as holotype are in the following collections: CDFA (5) and CAS (2).

***Araeoschizus hardyorum* Papp, new species, Figs. 16a and 53.**

A shiny, reddish chocolate-brown, sparsely squamulose species. Puncture lines in interspaces distinct, consisting of small punctures which are distantly spaced. A species which extends the distribution of Group VI to the north; distinctly isolated from any closely related species.

Head. – About as broad as long, to one-fourth longer than broad across ocular lobes; sides not parallel. Surface coarsely, densely punctate; sparsely covered with anteriorly decumbent, smoky yellow, curved squamules. Ocular lobe prominent, bold or nearly so, less coarsely punctate; interior margin shallow; ocular ridge curved, slightly elevated about eye level. Ocular groove deep. Posterior half of vertex slightly flattened. Frons moderately convex, frontal margin corrugated, straight; preocular angle prominent. Eyes large, deeply set, 20–21 facets dorsally, 5–6 ventrally. – Antennae relatively robust, not quite reaching posterior margin of prothorax. Sparsely squamulose; surface with deep, densely spaced punctures. Segment 1 broader, slightly longer than 2; 3 about half size of 1, all three narrower basally; 4–9 about same size, pearl-shaped; 10 about long as 9 but broader, slightly compressed on sides; 11 shortest, with plumose, angularly flat tip.

Prothorax. – About as long as broad; shorter than head. Anterior margin straight, with more or less narrowly rounded anterior angle; slightly constricted in posterior fourth, with prominent angles. Posterior margin as wide as anterior, nearly straight. Surface less densely punctured than head, sparsely squamulose, with slight indication of squamular rosette near middle of posterior margin. Surface medially flat, not uniformly concave. Margin covered with dark golden-yellow, erect squamules, which are denser, somewhat longer on anterior margin; denser yet, shorter on posterior, where they project outward from center.

Elytra. – Sides parallel, or nearly so; about evenly rounded anteriorly, posteriorly. About half again as long as head, prothorax combined; slightly more than twice as long as broad medially. Primary cordae slightly elevated, interspaces, with two longitudinal puncture lines, somewhat flat. Punctures actually (viewed at right angle to reflected light) small, deep, distance between same or slightly more than diameter of punctures. Size of

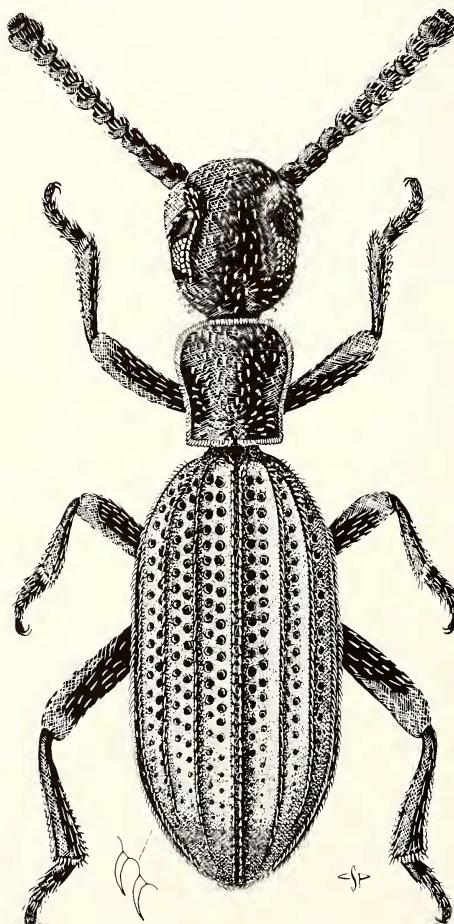


Fig. 53: *Araeoschizus hardyorum* Papp, n. sp.

punctures gradually decreases from about posterior fifth, while distance between punctures increases. Ridges with posteriorly decumbent, broadish, curved, pointed squamules, which in most cases reaching about middle of preceding squamule.

Underside.

Head. – Densely covered with small, deep, round punctures, distance between puncture about equals diameter of punctures. Bold. Gula smooth, flat. Center of submentum slithly protruding anteriorly; process broad, prominent, exterior sides broadly rounded, interior base carinated. Mentum broad; middle lighter color; surface near sides with several sideways protruding erect to suberect golden-yellow, club-shaped squamules. Gular line absent. Pit of ventral portion of eye deep; almost black.

Prothorax. – Surface slightly less densely covered with punctures as head. Bold, except prosternal process, which has few scattered larger punctures on surface, with few decumbent pale squamules especially in anterior portion, margin. Anterior carina broad; black; prosternal ridge narrow, hardly visible. Posterior margin with few, short, pale squamules.

Hind body. – Throughout with deep ellyptical punctures. Size of punctures largest on mesosternum, metasternum, where some almost touch; then gradually smaller from abdominal segment 1 posteriorly. Metasternal process narrow, with 4–6 squamules on margin. Center of mesosternum opposite narrowly rounded inner coxal procexx of abdomen deeply impressed, convex. All punctures with deeply set, flatly positioned squamule not longer than diameter of punctures. However, squamules on surface, margins of segments 4, 5, (especially 5) longer, some twice as long as diameter of punctures where squamule originates.

Legs. – Median pair slightly smaller; posterior longest. Surface with sparsely spaced minute punctures of which some have narrow, hair-like squamules much longer than diameter of punctures. Femorae less, tibia, tarsi more densely squamulose; squamules on dorsal edge of tibiae slightly more densely placed, thicker, club-shaped. Tibial collar consists of short, erect, sharply pointed golden-yellow squamules.

Length: 4.00–4.25 mm.

Distribution:

Holotype: Utah, Washington County, 2 mi. E. of Washington, V. 20 to VI. 8. 1980, 2600 ft., Dr. Ross Hardy collector. (From his Notebook: Entrée 22525.6, "Set 8 anti-freeze traps on May 20, 1980 in sand. – Sand sagebush and creosote bush. Sand verbenas in bloom.") In the collection of the CAS.

Paratype: One specimen, same data, in CDFA. (I suspect it is the male of the species.)

***Araeoschizus kaszabi* Papp, new species, Figs. 16a and 54.**

In general appearance it is very similar to *exiguus* (see Group V). The major difference is the absence of the secondary row of squamules; the shape of the head; the outline

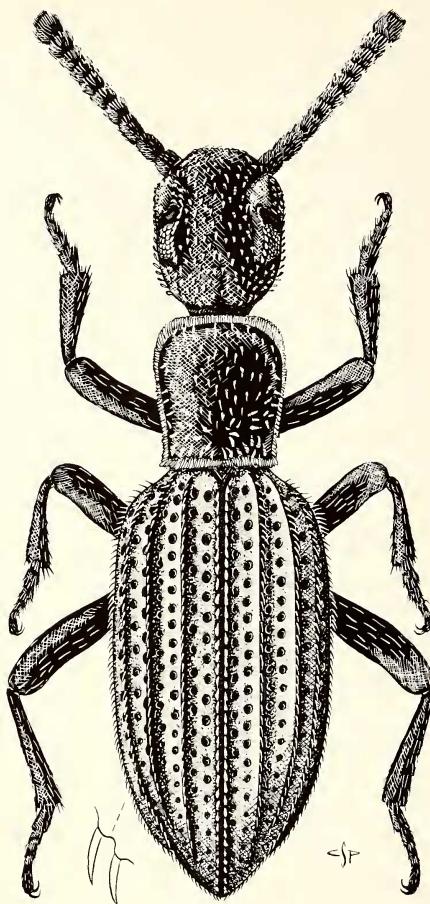


Fig. 54: *Araeoschizus kaszabi* Papp, n. sp.

of the prothorax with its dense marginal coverage of golden-yellow squamules. Also a much larger, reddish-brown species.

Head. — Nearly as broad as long; minutely, deeply punctured. Surface densely covered with short, forwardly decumbent, golden-yellow, club-shaped squamules. Ocular lobe prominent, evenly rounded exteriorly; densely squamulose; minutely punctured. Ocular ridge short, edge with closely spaced, erect line of squamules; sides black or blackish brown. Frontal margin broadly rounded; sides behind ocular lobe slightly constricted; gradually narrowing behind eyes into rounded occipital curvature. Occipital impression deep, broad, triangular. Vertex roundly elevated; gradually shallower toward almost flat frons. Edges with somewhat heavier erect squamules; those on margin of frons longer, narrower. Eyes deeply set in sparsely, finely punctured deep ocular groove; with 16–17 facets dorsally, 5 ventrally. — Antennae reaching middle of prothorax; joints well separated; densely squamulose. Joint 1 slightly longer than 2; 3 shorter than 2, longer

than 4; sides of 2, 3 parallel; 4-9 rounded on sides, well separated; 10 broader than 9; 11 short, lighter in color with pale plumose tip. Squamules on 1-3 coarse, semierect, shorter, broader than on rest of joints; thinner on 10, 11; pale yellow.

Prothorax. — Slightly shorter, at broadest anterior third same width as head. Surface finely, less densely punctured than head; density of squamules same as on head. Anterior margin slightly forwardly rounded; posterior straight; sides slightly constricted just behind anterior pronotal angle, then broadly outwardly rounded, in posterior-third almost parallel, with rectangular posterior pronotal angle. Margins black; on frontal, posteriorly with very dense covering of golden-yellow squamules, slightly shorter on sides, especially on posterior third. Posterior squamular line not broken medially; however, slight indication of rosette-like squamular design visible on somewhat flattish surface medially near posterior margin.

Elytra. — One-third longer than head, prothorax combined; about twice as long as broad medially. Anterior, posterior ends similarly rounded. Cordae distinctly, sharply elevated, corrugated, edges black; with posteriorly decumbent short, roundedly pointed yellow squamules which are somewhat less pointed near apical fourth. Sutural groove evenly punctured; sutural costae not elevated, with rows of sparsely spaced, posteriorly decumbent pale yellow, thin, short squamules. Interspaces broad, between costae nearly flat, with two puncture lines. Punctures deep, small, edges sharp; distance between (if viewed in not reflected light) punctures about twice or three times diameter of puncture; surface between smooth.

Underside.

Head. — Surface uniformly punctured; near sides with longer, towards middle with short, forwardly decumbent pale squamules. Gular area bald, smooth; gular line absent. Frontal margin of sublabial plate straight; its proboscis broadly triangular, tips narrowly rounded, at inner base slightly carinated. Basal groove deep; entire; broadly rounded posteriorly; sparsely punctured, squamulose.

Prothorax. — Surface smooth, sparsely covered with minute, deep punctures. Prosternal process broad; its procoxal margin, posterior portion behind coxal cavity with broad, flat, club-shaped, decumbent squamules over area of black color; middle portion reddish brown. Prosternal ridge flat. Margins black. Anterior carina roundedly elevated; smooth.

Hind body. — Shiny; reddish brown except black central area of metasternum. Mesosternum darker brown than abdomen, finely punctured, only narrow mesosternal apophysis sparsely squamulose. Metasternum flat, somewhat compressed medially; shiny; with sparsely spaced large punctures of which each with short, deep-set squamule diameter of puncture. Abdominal segments smooth, sparsely covered with minute punctures; each puncture with thin, posteriorly decumbent pale yellow squamule, somewhat longer at sides of segments 3, 4, 5. Size of punctures decreases posteriorly.

Legs. — Median pair smallest, posterior largest; darker brown than abdominal segments. Surface minutely punctured, evenly covered with narrow, long, decumbent

squamules. Squamules on margin of tibiae somewhat heavier, denser. Tibial collar consists of few longer, spine-like squamules, mostly on ventral side of tibia.

Length: 3.8–4.0 mm.

Distribution:

Holotype: California, San Diego County, Scissors Crossing, 6 mi. E. of Banner, IX. 2. 1966, J. Powell, P. A. Rode collectors. Dominant ground cover was the Composit, *Haplopappus venetus vernonioides*, as noted on specimen label. In the collection of CAS.

Paratype: 2 specimens, same data. In the UCB and CDFA collections.

Additional specimens: California, San Diego County, Scissors Crossing, V. 15. 1968, F. G. Andrews collector, in CDFA; San Bernardino County, Hinkley, II. 26. 1958, Young, Turney and Harper collectors (under board), 2 specimens, in the CDFA collection.

Araeoschizus kubai Papp, new species, Figs. 16a and 55.

A blackish brown, dull large species. By its obscure longitudinal puncture lines in elytral interspaces, the very closely spaced squamules on the elytral costae, and by its reddish brown femorae it is easily differentiated from any other species. In some respects it resembles *simulans* Casey. It is noted that the mouth area of this species is the smallest in relation to the size of head in any species known.

Head. – Slightly longer than broad; sides nearly parallel. Surface minutely punctured; densely covered with anteriorly decumbent, broad, club-shaped yellow squamules. Blackish brown; frons anterior from between broadly rounded ocular lobes reddish brown. Occipital impression flat, squamulose. Vertex slightly elevated. Anterior margin of ocular lobe deep, continuing at base of highly elevated, sharply curved, on ridge densely squamulose ocular ridge which reaches behind eye level. Ocular groove shallow, eyes deeply set, 18 facets dorsally, 5 ventrally. – Antennae robust, reaching behind middle of prothorax; closely covered with decumbent, golden-yellow squamules. Joints 1–3 blackish, others reddish brown. Joint 1 slightly longer than 2; 3 shorter than 2 but longer than 4; 4–9 about uniform size; 10 slightly longer, broader than 9; 11 short, with plumose tip. Size of squamules from 1–9 uniform, on 10 slightly narrower, 11 hair-like.

Prothorax. – Slightly broader than long at anterior third; one-fourth shorter than head. Surface minutely punctured; densely squamulose. Anterior margin not straight; anterior pronotal angle broadly, evenly rounded; sides slightly constricted in posterior fourth with short posterior pronotal angle. Densely squamulose, especially anterior, posterior margins; sides with longer squamules on anterior half; squamules golden-yellow. Slight impression on posterior center portion near margin surrounded with somewhat longer squamules forming a rosetta around impression. Longitudinal arrangement of squamules between anterior, posterior margins suggests presence of longitudinal pronotal groove; area between flat.

Elytra. – About twice as broad as long; nearly one-fifth longer than head prothorax combined. Sides in center half parallel, shoulder broadly, posterior more narrowly

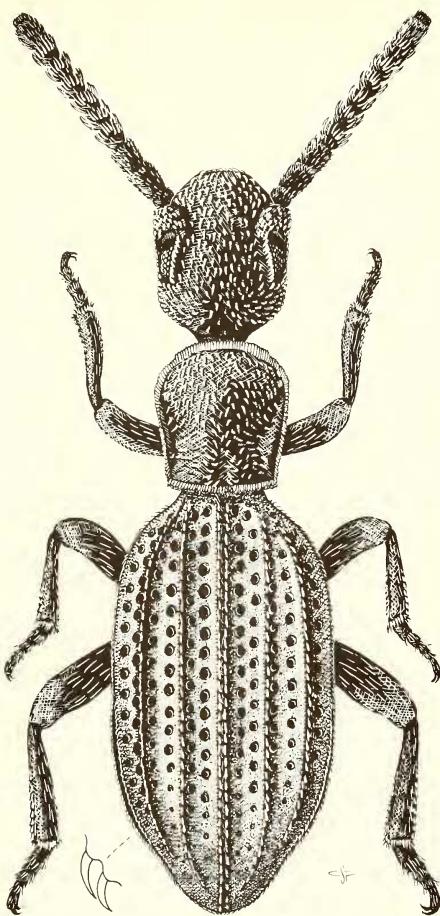


Fig. 55: *Araeoschizus kubai* Papp, n. sp.

rounded; tip somewhat broad. Cordae strongly elevated, edges with closely spaced, short, broad-based, sharply pointed, posteriorly decumbent squamules. Interspaces more convex, at middle – where surface is slightly flattened – interspaces broadly flat. Puncture lined obscure, due to rounded edges of sparsely spaced punctures. Distance between puncture about 2–4 times their diameter. Sutural groove flat, shallow, finely punctured; its margin (sutural costa) with slightly shorter squamules.

Underside.

Head. – Surface minutely punctate, sparsely covered with anteriorly decumbent pale yellow squamules. Gular area bold, deeply impressed; gular line absent. Submentum small; frontal margin straight, slightly shorter than posterior; reddish yellow, on sides with outwardly projecting longer, club-shaped, golden-yellow recumbent squamules. Maxillary palpus also reddish brown, tip pale yellow; surface finely squamulose. Labial palpus lighter brown; terminal joint long. Subgenal process relatively narrow; anterior

edge slightly convex; inner edge of process straight, at base widely, deeply carinated; exterior edge slightly curved outwardly; broader at base. Basal groove of submentum deep, broad. Margin of pit of ventral portion of eye narrowly elevated.

Prothorax. — Margins broadly black, inner area blackish brown. Surface sparsely covered with small punctures except prominent prosternal ridge, which does not reach anterior carina. Bold, except broad prosternal process, area between coxae with few flat, pale squamules. Impressions on both sides near anterior end of prosternal ridge deep, coarsely punctured.

Hind body. — Somewhat shiny; sparsely covered with elongated shallow punctures of which each with posteriorly decumbent squamule. Mesosternum short, sparsely punctured. Mesosternal process narrow, posterior edge straight; edges, middle squamulose like posterior side of mesocoxae. Metasternum broad. Punctures large, squamules slightly longer than longer diameter of punctures; flat, decumbent. Abdomen, except black edges, reddish brown; similarly punctured. Size of punctures decreases posteriorly, while length of squamules slightly increases. Intercoxal process broad; middle highly rounded; exterior edges near middle of metacoxae slightly protruding anteriorly.

Legs. — Medial pair shortest, posterior longest. Reddish brown, except blackish basal fourth of femora. Densely squamulose; squamules decumbent, originating in minute punctures; uniform size throughout. Anterior edge of tibia with somewhat broader, slightly longer recumbent squamules. Tibial collar absent.

Length: 4.5 mm.

Distribution:

Holotype: Arizona, Pima County, Santa Catalina Mts., Sabino Canyon, III. 9. 1969, F. Werner collector. In CAS.

Paratype: One specimen, same data. In CDFA.

Araeoschizus problematicus Papp, new species, Fig. 16c and 56.

In some respects resembles *expeditionis*, slightly smaller and lighter in color. Prothorax without longitudinal ridges.

Head. — About one-fourth longer than prothorax. Frontal margin broadly rounded, margin with 10 longer, hair-like bristles; preocular lobe large, distinctly elevated, with sharp, pointed angle at front; moderately rounded at sides, almost following curvature of frontal margin anteriorly; slightly indented near anterior end of eyes; sides converging toward tempora which is broadly rounded. Frontal portion of ocular pit broadly rounded, much larger than postocular half. Eyes with 19 facets dorsally, 6 ventrally. Shiny "§" surface densely covered with small circular punctures, each with one short, somewhat thicker, nearly recumbent pale yellowish-orange squamules; punctures somewhat denser at base of slight triangular impression on base of head, just behind slightly convex vertex, which gradually slopes anteriorly to more abruptly dropping frons. Internal basal groove at anterior portion of ocular lobe deep, not covered with squamules, seemingly continuing in prominent, curved, slightly slanted posterior ocular ridge, which densely

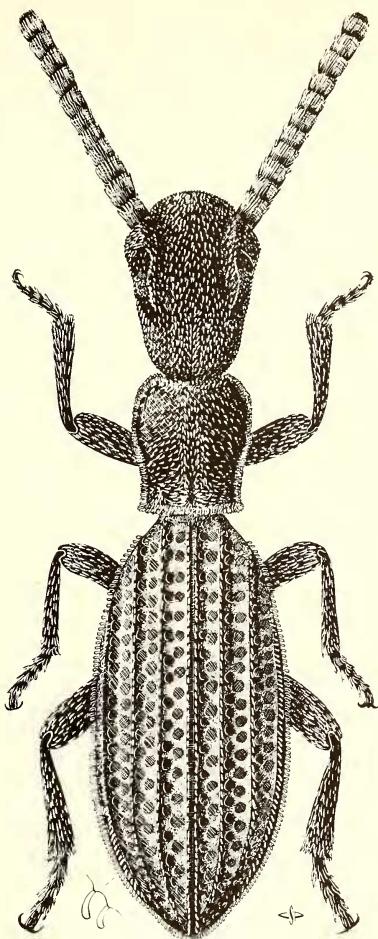


Fig. 56: *Araeoschizus problematicus* Papp, n. sp.

covered with short, erect squamules. — Antennae short, joints 2, 3 slightly longer than others, 11 short, about half size of 10, flat, densely covered with thin, pale-colored hairs; flat tip plumose.

Prothorax. — Much shorter than head, slightly narrower about posterior fourth. Shiny; surface speckled with shallow, even, circular punctures, each with squamules of same size, density as on head. Broader at frontal third, narrowly rounded anteriorly, slightly fused at posterior third, where from sides became parallel, then ends in sharply cut corners. Posterior margin nearly straight. Posterior fourth with slight median depression, which in some specimens may reach forward to third of length; shallow impression appears more prominent because of presence of radially spaced, longer, semierect squamules about its marginal area. Squamules longer on frontal, hind margins, slightly shorter on sides, densely spaced, erect; posterior margin with denser, broader band of squamules.

Elytra. — Slightly more than three-times longer than prothorax, shoulders more abruptly, posterior end more gradually rounded. Three longitudinal ridges very prominent, not approaching each other anteriorly; densely covered with erect squamules with slightly curved, broader rounded tips. First ridge longer than 2, which slightly shorter than 4 (which looks like marginal ridge in dorsal view); 3 entire, as is pre-marginal ridge, which joins 3 and sutural ridge at posterior end. Pre-marginal ridge (not seen dorsally) with very short, sparsely spaced squamules on frontal two-thirds, squamules slightly longer, more densely spaced toward posterior end. Elytral margin smooth, narrow space between margin and pre-marginal ridge with one row of smaller, more densely spaced punctures than those of dorsal elytral intervals. Shiny interspaces each with two rows of well defined puncture of even size, in some places opposite, in some alternate in position; distance between punctures as wide as diameter of each puncture. Double-edged sutural ridge very prominent, between ridges two rows of very minute punctures; ridges with semierect squamules of same size as other ridges. .

Underside. — Shiny; slightly darker-brown than above. Head with small punctures, punctures with short, recumbent squamules. Submentum narrow, with dark postgenal process; base about middle deeply convex, this convexity narrows toward center, then widens before reaching base of head, relatively deep, squamules lining its edges make this groove seemingly deeper. Pronotum covered with same density, size squamules as head. Abdomen with slightly larger punctures, most with squamules, those are thin, recumbent in position, size; density increasing gradually toward posterior end.

Legs. — Slightly darker in color, slender; middle pair smallest. Tarsal groove of femora narrow; femora less densely covered with smaller squamules than tibiae with longer, larger squamules, broad end with a circular row of slightly longer, spine-like squamules. Tarsal joints covered with squamules of same size, intermixed with some longer ones.

Length: 4.9–5.1 mm.

Distribution:

Holotype: Mexico, Zacatecas Province, Zacatecas, August 25, 1969. Collected by Dr. John T. Doyen. In the CAS collection.

Paratype: Two specimens with same data as holotype. One in the UCB, one in the CDFA collection.

***Araeoschizus simplex* Casey, Figs. 16a and 57.**

Casey, Ann. New York Acad. Sci., 5, 1890:369–370. — Horn, Trans. Amer. Ent. Soc., 17, 1890:341–342. — Champion, Biol. Centr.-Amer., Col. 4 (1), 1892:491. — Casey, Proc. Washington Acad. Sci., 9, 1907:489.

A relatively large, shiny, dark chocolate-brown species; in relation to the size of head-prothorax with a long, narrow hind body. The following description is based on the holotype.

Head. — About one fifth longer than broad across ocular lobes; squarish-rounded; anterior end flat medially. Surface minutely densely punctate, sparsely squamulose (on fresh specimens, more so). Ocular lobe broad, roundedly pointed exteriorly; finely

punctate; squamulose; interior margin broad, flat. Ocular ridge long, shallow; with dense row of erect squamules. Occipital impression flat; vertex slightly elevated, frons less so; sparsely squamulose. Ocular groove deep, long; dorsal, ventral margins inwardly curved about eye level. Eyes not deeply set; with 16 large facets dorsally, 5 smaller ventrally. — Antennae thin, relatively short, barely reaching behind middle of prothorax. Joints well separated; 1-4 darker, others lighter brown in color; sparsely squamulose.

Prothorax. — Long as broad. Anterior portion slightly constricted, sides nearly straight. Edges sparsely squamulose. Surface with large, deep punctures, some with decumbent squamules (on fresh specimens, more so), of which some form small rosetta near middle of posterior margin, which is densely covered with short, golden-yellow squamules.

Elytra. — Slightly more than twice as long as broad. Sides parallel; shoulders narrow; posterior broadly rounded. Longitudinal cordae slightly elevated, with

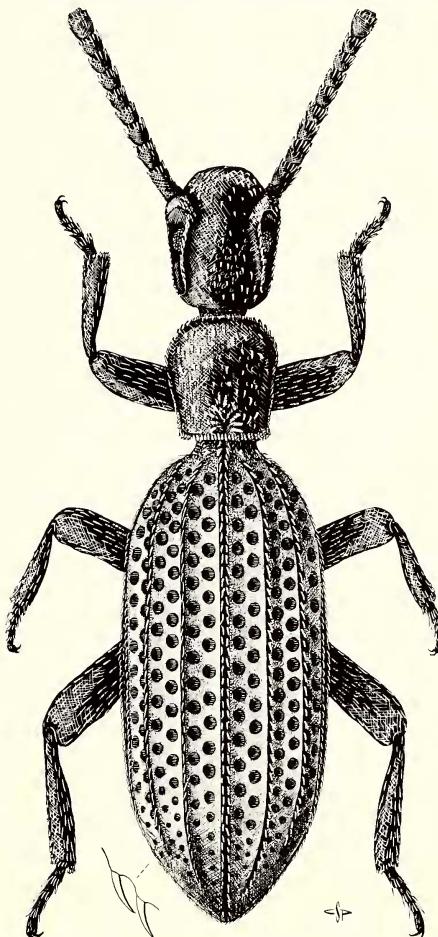


Fig. 57: *Araeoschizus simplex* Casey

row of posteriorly decumbent, not closely spaced, curved, roundedly pointed yellow squamules. Punctures lines in smooth, flat interspaces prominent; punctures deep, sharp-edged; distance between less than diameter of punctures.

Underside.

Head. — Surface with sparsely spaced small punctures; evenly convex; gular area slightly triangularly depressed. Submentum, post genal prominent, blackish; frontal margin slightly indented in middle; interior base of proboscis broadly carinate; process more or less straight in interior edge, exterior broadly, tip narrowly rounded. Basal groove long, from base to base of process, deep, posteriorly pointing, triangular, surface minutely punctured, shiny.

Prothorax. — Narrow on coxal area. Prosternal ridge flatly rounded. Surface punctured as head. Prosternal process moderately condensed between coxae; edges with longer, posteriorly decumbent pale squamules.

Hind body. — (Mesosternum, metasternum not visible.) Abdomen evenly convex, not impressed (like *tenuis*), sparsely punctured, punctures large, deep, distance between punctures larger than diameter of punctures; each with decumbent squamula, most larger than puncture diameter. Punctures, squamules decreasing in size posteriorly, minute on segment 5. Margin of segment 1, 2 straight, parallel, 3 middle sharply curved anteriorly, 4 normally rounded with sharp triangular impression on anterior center of segment 5.

Legs. — About even in size; median pair slightly smaller. Dark brown, shiny; finely punctured; densely covered with decumbent long, thin squamules. Tibial collar absent.

Length: 3.8–4.0 mm.

Distribution:

Holotype: Texas (El Paso), (USNM, No. 46397). Casey 1890:370) gave additional distribution data, as Tucson, Arizona, specimens I have not seen from the USNM material.

Additional distribution:

Texas. — Big Springs, by Wickham (no collecting date), (USNM) 2 specimens; same (MCZ) 1 specimen. — 11 mi. S Marfa, Predio County, VIII. 27. 1971, by Kirby W. Brown (KB) 1 specimen.

New Mexico. — Eddy Co. 26 mi. E Carlsbad, VI. 16. 1977, 12 specimens in Pitfall trap; Donna Anna Co. 15 mi. N Las Cruces, Jarnad Ranch, 16 specimens in Pittrap, collected by Dave Richman.

Arizona. — Tucson (no collecting date) by Wickham, the specimen probably seen by Champion (BM) 1 specimen. — Yumy, V. 14. 1942, by Ira La Rivers (DAN) 1 specimen. — Phoenix, VIII. 16. 1933, by Robert H. Crandall (from the E. Liljeblad collection), (FM) 2 specimens.

Mexico. — Chihuahua, Paso del Norte (no collecting date), by Hoge (BM) 1 specimen; seen by Champion and included in his work (1892:491) the only specimen recorded from Mexico.



Fig. 58: The Algadones Dunes of southeastern California, habitat for *Araeoschizus andrewsi*
(Photo by F. G. Andrews).



Fig. 59. Scenery from the Cadiz Dunes, on the southeastern corner of San Bernardino County, California, habitat for *Araeoschizus hardyi* (Photo by F. G. Andrews).

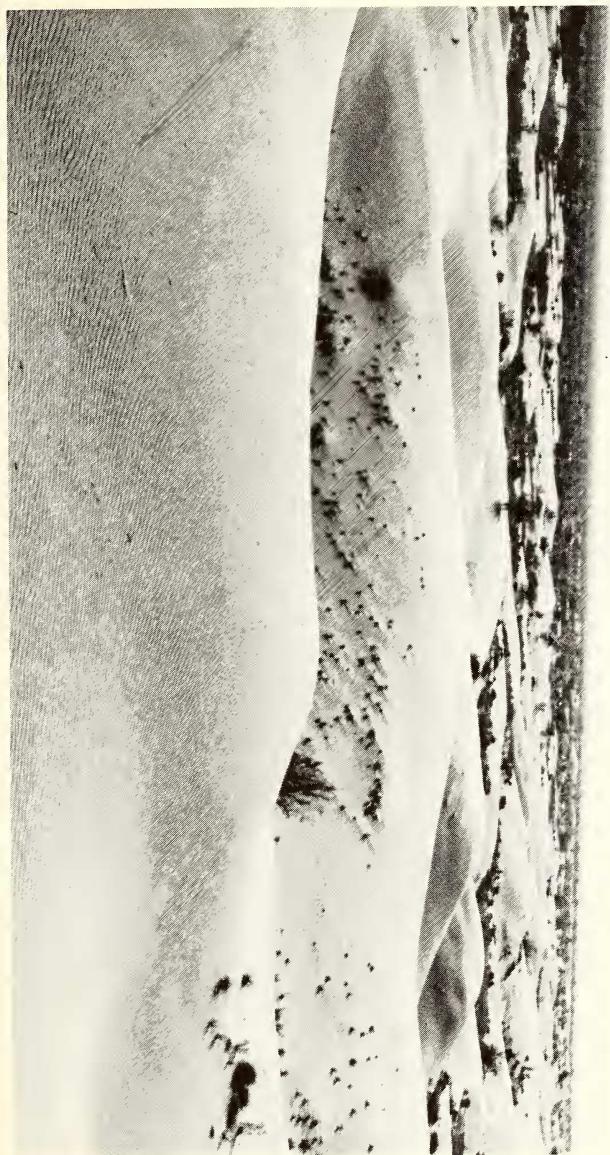


Fig. 60: Portion of the Algodones Dunes (see Fig. 58) about 10 kilometers southeast from Glamis. This is the southernmost point of the distribution of *Araoschizus harayi*, where it is very scarce, while *A. andrewsi* is very abundant (Photo by F. G. Andrews).

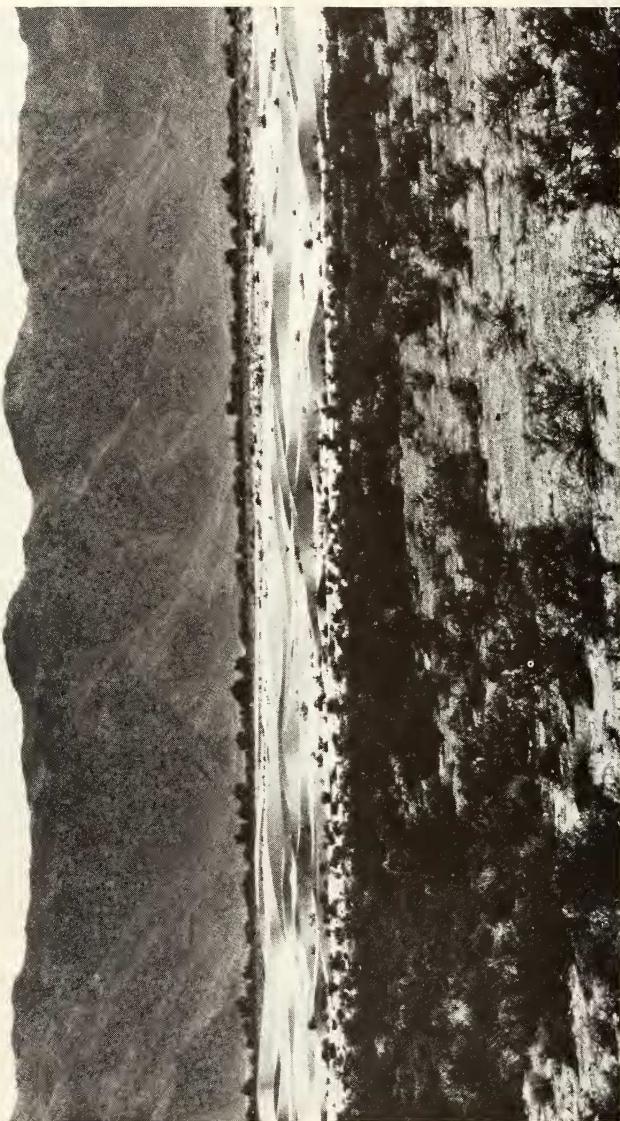


Fig. 61: Rice Dunes are low sand dunes southeast from the desert town Rice, in the northeastern corner of Riverside County, California, some 16 kilometers west from the Colorado River. *Araeoschizus hardyi* is the dominant species here (Photo by F. G. Andrews).

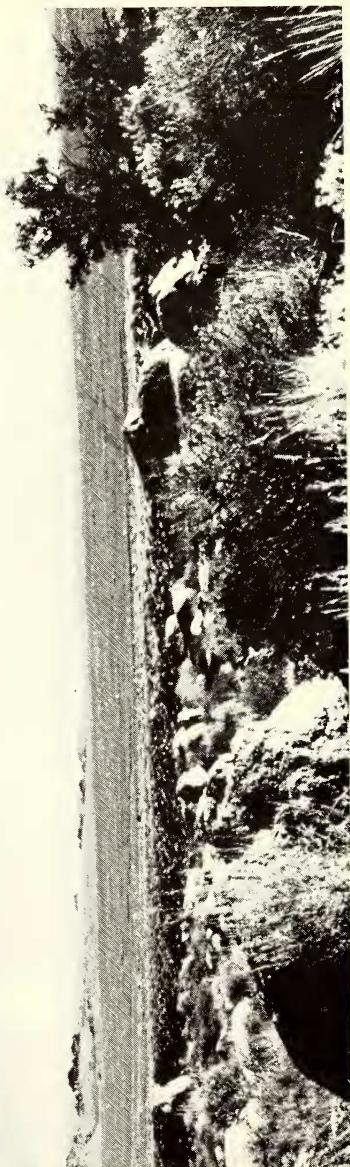


Fig. 62: North side of Owens Lake, west from the Sierra Nevada. Some water is still visible from the distance (taken in December 1964) but slight motion of air is enough to cover the area with dust (Photo by C. S. Papp). See also Fig. 63 and 64.

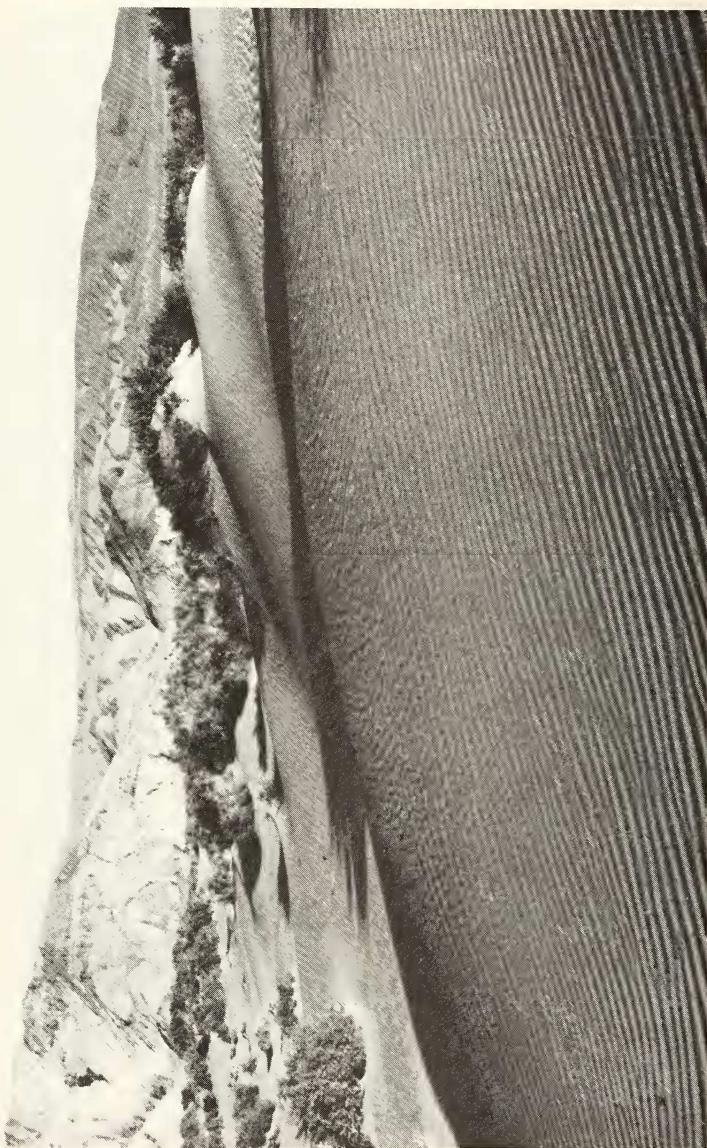


Fig. 63: Once fertile Owens Valley, due to the excessive pumping of surface and underground water into the Los Angeles area, now is partially a desert, from where *Araeoschizus sulcicollis* Horn is described. This is a view of the sand dunes (taken September 1977) at the north end of the now dry lake (Photo by F. G. Andrews). See also Fig. 62 and 64.



Fig. 64: New sand dunes forming on the south end of the bed, where some 30 years ago Owens Lake was (Photo by F. G. Andrews). See also Fig. 62 and 63.



Fig. 65: Eureka Valley, looking south. Sand dunes in the distance where *Araeoschizus sulcicollis* is abundant (Photo by C. S. Papp).



Fig. 66: Saline Valley Dunes, looking southeast from about the middle of the dunes, where *Arachnites sulcicollis* is found (Photo by C. S. Papp).



Fig. 67: Bluff Dunes in southeastern Utah. *Araeoschizus utahensis* is found in this shallow dunes
(Photo by F. G. Andrews).



Fig. 68: Part of the Gran Desierto east from the Colorado River delta in Mexico. *Araeoschizus wasbauerorum* is described from here (Photo by F. G. Andrews).

Bibliography cited.

Allred, D. E. Beck and C. D. Jorgensen, 1963. Biotic communities of the Nevada Test Site. – *Science Bulletin, Biological Series*, 2 (2):1–52, illustrated (Brigham Young University).

Allred, D. M. and V. M. Tanner, 1979. Beetles from the environs of Lake Powell in southern Utah and northern Arizona. – *Great Basin Nat.*, 39 (1):89–96.

Andrews, F. G., A. R. Hardy and D. Giuliani, 1979. The Coleopterous Fauna of Selected California Sand Dunes. – *California Department of Food and Agriculture, Insect Taxonomy Laboratory*, 142 pp. 21 figs.

Arnett, R. H. 1963. The beetles of the United States. – *The Catholic University Press, Washington, D. C.* 1112 pp. (p. 650, 669). Illustrated.

Blackwelder, R. E. 1945. Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and Sout America. Part 3. – *Bull. 185, U.S. Nat. Mus.*, pp. 343–350.

Blackwelder, R. E. and R. M. Blackwelder, 1948. Fifth Supplement to the Leng Catalogue of Coleoptera of America, North of Mexico. – *Mount Vernon, N.Y.*, pp. 1–87 (p. 28).

Blaisdell, F. E. 1943. Contribution Toward the Knowledge of the Insect Fauna of Lower California. No. 7: Coleoptera, Tenebrionidae. – *Proc. Calif. Acad. Sci.*, 24 (7):171–288, plates 10 and 11 (pp. 214–216, plate 11).

Boddy, D. W. 1965. In Hatch 1965: Tenebrionidae, p. 130 and 134.

Casey, T. L. 1890. Coleopterological Notices, II. – *Ann. N. Y. Acad. Sci.*, 5:307–504 (pp. 368–370).

Casey, T. L. 1907. Revision of the North American Components of the Tenebrionid Subfamily Tentyriinae. – *Proc. Washington Acad. Sci.*, 9:275–522 (pp. 281, and 484–491).

Champion, G. C. 1884–1893. *Biologia Centrali-Americana, Coleoptera* 4 (1):I–XXXIV and 1–572, 23 plates (1884:51, and 1892:490–491).

Crotch, G. R. 1873. Check List of the Coleoptera of America, North of Mexico. – *Naturalist's Agency, Salem, Mass.*, 136 pp. (p. 103).

Doyen, J. T. and P. A. Opler, 1973. Distributional affinities of some xerophilus insects (Coleoptera, Lepidoptera) in Central California. – *The Southwestern Naturalist*, 18 (3):305–316.

Doyen, J. T. and J. F. Lawrence, 1979. Relationships and higher classification of some Tenebrionidae and Zopheridae (Coleoptera). – *Syst. Eng.*, 4:333–377, 54 figs. (pp. 350–351).

Fall, H. C. 1901. List of the Coleoptera of Southern California. – *Occ. Papers, Calif. Acad. Sci.*, 8:1–282 (p. 30 and 163).

Fall, H. C. and T. D. Cockerel, 1907. The Coleoptera of New Mexico. – *Trans. Amer. Ent. Soc.*, 33:145–218 (p. 202).

Gebien, H. 1910. Catalogus Coleopterorum, Pars 15, Tenbrionidae (I). – pp. 1–166 (p. 105).

Gebien, H. 1937. Katalog der Tenebrioniden (Col. Heteromera). – *Publicationi del Museo Entomologico "Pietro Rossi", Duino*, No. 2:505–883 (pp. 178–179).

Hardy, A. R. and F. G. Andrews, 1979. An Inventory of Selected Coleoptera from the Algodones Dunes. – A Report to the Bureau of Land Management, in Fulfillment of Contract No. CA-060-CT-8-68. – *Calif. Dep. Food and Agric., Insect Taxonomy Lab.*, 1–36, figs.

Harris, R. 1979. A glossary of surface sculpturing. – *Occasional Papers in Entomology, Calif. Dep. Agric., Insect Taxonomy Lab.* No. 28:1–31, 43 figs.

Hatch, M. H. 1965. The Beetles of the Pacific Northwest. – *University of Washington Press, Publ. in Biology*, Vol. 16, 4:1–268, 28 pls. (p. 134, pl. 21, fig. 2).

Henshaw, S. 1885. List of Coleoptera of America, North of Mexico. – *Amer. Ent. Soc., Philadelphia, Pa.* 161 pp. (p. 116).

Henshaw, S. 1895. Third Supplement to the List of Coleoptera of America, North of Mexico. – *Amer. Ent. Soc., Philadelphia, Pa.*, 62 pp.

Horn, G. H. 1867. Notes on the habits of a few California Coleoptera. – *Proc. Ent. Soc. Amer.*, 6:289–293.

Horn, G. H. 1870. Revision of the Tenebrionidae of America, North of Mexico. – *Trans. Amer. Philos. Soc.*, 14 (64):253–404.

Horn, G. H. 1890. Some notes on *Araeoschizus*. – Trans. Amer. Ent. Soc., 17:339–343.

Kaszab, Z. 1969. The scientific results of the Hungarian Soil Zoological Expeditions to South America. 17: Tenebrioniden aus Chile. – Opusc. Zool., Budapest, 9 (2):291–337, figs.

Kaszab, Z. 1975. Tenebrioniden aus Indien. – Acta Zool. Acad. Sci. Hung., 21 (1–2):1–38, figs.

Kissinger, D. G. 1955. New distribution and habitat records of North American Coleoptera. – Col. Bull., 9 (1):13–15.

Koch, C. 1941. Phylogenetische, biogeographische und systematische Studien über ungeflügelte Tenebrioniden. – Mitt. Münchn. Ent. Ges. 39 (1):252–314, 2 plates (pp. 295–304).

Koch, C. 1955. Monograph of the Tenebrionidae of South Africa (I). – Transvaal Museum, Memoir 7:I–XIII+1–242, 24 plates, 2 maps and 158 textfigs. (pp. 10–11).

Lacordaire, T. 1859. Genera des Coléoptères. – Hist. Nat. Ins., 5 (1):103.

Lavigne, R. J. 1969. Bionomics and Nest Structure of *Pogonomyrmex occidentalis* (Hymenoptera: Formicidae). – Ann. Ent. Soc. Amer., 62 (5):1166–1175, figs.

Le Conte, J. L. 1851. Descriptions of new species of Coleoptera from California. – Lyceum of Nat. Hist. New York, 5:125–184 (p. 138).

Le Conte, J. L. 1859. Descriptions of some new genera and species of Coleoptera from the vicinity of the southern boundary of the United States of America. – Arcana Natura, pp. 121–132, pls. 12–13 (p. 121, pl. 13, fig. 11).

Le Conte, J. L. 1863. List of the Coleoptera of North America. – Smithsonian Inst., Washington, D.C., Smithsonian Miscell. Coll., 140:1–78 (p. 59).

Le Conte, J. L. and G. H. Horn, 1883. Classification of the Coleoptera of North America. – Smithsonian Miscell. Coll. 507. (Tenebrionidae pp. 358–387), (p. 366).

Leng, C. W. 1920. Catalogue of the Coleoptera of North America, North of Mexico. – Mount Vernon, N.Y., 1:I–X+1–470 (p. 223).

Marcuzzi, G. 1954. Tenebrionid beetles of Curacao, Aruba, Bonaire, and the Venezuela Islands. – Studies Faun. Curac. Carrib. Isl., The Hague (Nijhoff), 5:1–36, 7 pls. (pp. 7–8, pl. 3).

Melsheimer, F. E. 1853. Catalogue of the Described Coleoptera of the United States. (Revised by S. S. Haldeman and J. L. LeConte). – Smithsonian Institution, Washington, D.C., 174 pp. (p. 135).

Moore, I. 1937. A List of Beetles of San Diego County, California. – Occ. Papers San Diego Soc. Nat. Hist. 2:1–109 (p. 69).

Pallister, J. C. 1943. The Tenebrionid beetles of North Central Mexico collected on the David Rockefeller Mexican Expedition of 1947. – Amer. Mus. Novit., No. 1697:1–55 (pp. 9–10).

Papp, C. S. 1961. Checklist of Tenebrionidae of America, North of the Panama Canal. – Opuscula Entomologica, 26 (1–2):97–140 (p. 105).

Papp, C. S. 1978. Checklist of Tenebrionidae of America, North of the Panama Canal. – A reprint of the 1961 edition, by the Cal. Dept. Agric., Spec. Publ. 7:1–88 (p. 18).

Reitter, E. 1886. Revision der mit *Stenosis* verwandten Coleopteren der Alten Welt. – Deutsche Ent. Zeitschr., 30:97–144 (p. 98).

Schwarz, E. O. 1929. Letters of E. O. Schwarz, a selection by John D. Sherman, Jr. – Journ. N. Y. Ent. Soc., 37:239, 262, and 268.

Snelling, R. R. 1976. A revision of the Honey Ants, Genus *Myrmecocystus* – Sci. Bull., Nat. Hist. Mus. Los Angeles, 24:1–163 (p. 10).

Tanner, V. M. 1945. A new species of *Araeoschizus*. – Great Basin Nat., 6:125–126.

Tanner, V. M. and W. A. Packham, 1965. Tenebrionidae beetles of the Nevada Test Site. – Brigham Young University, Science Bulletin, 4 (1):1–44 (pp. 9 and 20–21).

Van Dyke, E. C. 1933. Peculiarities of the Coleopterous Fauna of Semiarid Southwestern North America. – Ve Congress Internat. d'Ent., Paris, pp. 471–477.

Washington, Entom. Soc. 1897. Meeting of October 14, 1897, 4:209.

Wheeler, G. C. and J. Wheeler, 1973. Ants of Deep Canyon. – Philip L. Boyd Deep Canyon Desert Research Center Publications, I–XIII+1–162.

Woodworth, C. W. 1913. Guide to California Insects. – The Law Press, Berkeley, Ca., First Semester, 360 pp. (p. 186).

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